1877

187

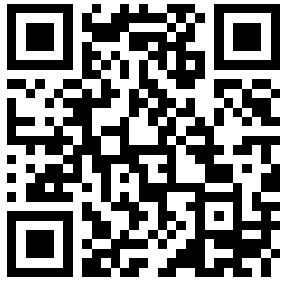
1881

188

An industrial achievement

Pope manufacturing co., Boston

219-223 Columbus Ave.

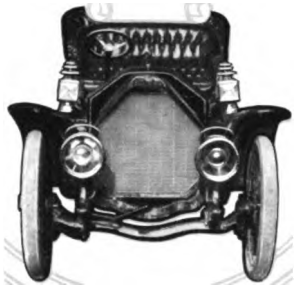


AN INDUSTRIAL ACHIEVEMENT

1877

1907

POPE
MANUFACTURING
COMPANY
HARTFORD, CONN.
U S. A



Foreword

TO the man who works, and loves his work, no imaginative romance is so full of vital interest as the great Romance of Business. No story of adventure is so absorbing as a tale of struggle, hardship and final triumph on the great battlefields of Trade and Manufacture.

Those who know what it means to fight the battles of life derive a keen pleasure from listening to stories of the origin, the growth and the success of great business establishments.

Manufacturing is the most interesting of all forms of business, particularly when the finished product is of a complicated or delicately adjusted character, and the natural question that arises in the mind upon viewing a vast manufacturing plant is: "How did it all come about?"

We all know the years of toil and thought and experiment it takes to reach anything like perfection in the manufacture of a newly-invented commodity, and as we see the result of those years of toil and study many questions spring naturally to the lips.

It is in some degree to answer such questions with reference to one great manufacturing plant, or rather chain of manufacturing plants, that this book is published. It is intended as a milestone to mark the completion of a certain important stage in the development of the company. It is a record of the achievements of the company, a description of its personnel, the places in which its work is done, the manner in which it is done, the materials and methods used, and the character of the results obtained.

It is believed that the book will be interesting to many who know what the word "Pope" stands for in connection with automobiles and bicycles, and would like to know the underlying causes.

Col. Albert A. Pope
President

Growth and Development

THE successful displacement of animal power by mechanical devices is an old problem. The first records of achievements in this direction are so fragmentary and imperfect that the earliest conception of the idea is hidden in the gloom of the past. We know, however, that the desire to travel faster than muscular force can carry us is so old that the memory of man runneth not to the contrary. From the rudimentary ox cart of India, with its solid wooden wheels and straight platform body, to the twentieth century mile-a-minute automobile is a long step forward, and the history of the interim is full of attempts, partial successes and failures to accomplish the desired end. The advance was a gradual evolution which gained unheard-of acceleration in modern times as our environment became improved and men of aggressive temperament came to the front prepared to handle in a broad way the vital questions of the day.

Immediately savages begin to travel or migrate they establish paths or trails through prairie, plain and forest. When draft animals come into service the traffic demands a roadway, and so it has followed as a natural sequence that as the mode of transportation has improved, as the desire to travel rapidly has been realized, the highways have demanded greater attention.

It was in learning to ride the old-fashioned high wheel that Colonel Albert A. Pope, the president and founder of the Pope Manufacturing Company, had forcefully impressed upon his mind the indifferent condition of the highways and the great importance of carrying through such a reform as would insure the building and maintenance of good roads throughout the entire country. When, therefore, he turned the attention of his company to, and took up, the manufacture of bicycles he joined with this business venture a vigorous and persistent campaign for the betterment of our common roads.

The indomitable push and optimism which enabled the schoolboy to build up a little independent vacation business, giving profit to himself and employment to some of his mates, cropped up again in the young man as he worked patiently at a clerkship in a shoe findings establishment, and saved carfare by walking ten miles a day; and it was still more clearly emphasized in the career of the young lieutenant who went into active service in August, 1862, and won his way upward to the rank of captain and major, and at the end of the conflict was brevetted lieutenant-colonel for meritorious conduct in battle. The man who works diligently, plays hard, fights to the finish and stands privation with a smile is the kind of character that wins out in business campaigns and economic reforms.

The Pope business was begun in Boston, at Dock Square, just after the close of the Civil war, and with money saved from the soldier's pay. It was afterwards continued in Pearl Street and 45 High Street. The Pope Manufacturing Company was organized in

GROWTH and DEVELOPMENT

45 High Street, Boston, Mass.

87 Summer Street, Boston, Mass.

1877

1878

1881

1887

1892

219-223 Columbus Ave.
Boston, Mass.

597 Washington Street, Boston, Mass.

79 Franklin Street, Boston, Mass.

1876, and was at first interested in the handling of small patented articles, among which the air pistol was a leader. The management, just at the time more business was needed, and as if by magic, stumbled on to the bicycle idea, and it is of interest to note just here that the first wheel built in 1877 under the supervision of Colonel Pope and his English friend, John Harrington, cost the tidy sum of $313. That was the great grandfather of all the Columbias and a host of other bicycles which came along so rapidly in the following years; and, curiously enough, it was lost sight of, and by the time value attached to it as a relic, rewards were offered for its recovery, but without avail.

Though but $3000 in cash was paid in as a working capital for the company, the start was a vigorous one, and at 87 Summer Street, up three flights of stairs and in one room, the business received its first real impetus.

Here is indeed an illustration of the way in which great things will grow from small ones when the small things have behind them a good idea with the right sort of men to carry it out.

At this time the Pope Manufacturing Company had no stretch of factories, no army of workmen, no fine offices, no clerks. The entire force comprised the president, his cousin, Edward W. Pope, and two boys. They did all the work, filled all the positions and were at once the salesmen, the bookkeepers and the corresponding clerks. The whole establishment at 87 Summer Street, offices, sales department, riding school and repair shop, was nothing better than a loft with a sort of half-story garret overhead. A pine desk for the treasurer and a black desk for the president were the most conspicuous pieces of the scanty office furniture.

Up to February, 1878, the company did an importing business with ever-increasing success, but by that time there was distinctly felt the need of a close alliance with, or an ownership of, a good manufacturing plant in America, and following out this idea an order was placed with the Weed Sewing Machine Company, of Hartford, Connecticut, a concern well equipped for the work and able to take it on to advantage as a supplement to their sewing machine business which was just then beginning to lag. The business increased with such rapidity that the Pope Manufacturing Company soon became the largest customer of the Weed Sewing Machine Company, and then bought control of its stock and finally absorbed the corporation.

Only those who have had experience in making mechanical devices can comprehend the great annoyance and positive danger which come from complications in patent matters and the necessity of controlling the situation as a protection. At the very outset the company encountered a serious difficulty in the shape of a valuable patent in the hands of Richardson & McKee, of Boston. As this was one of the rare blanket patents it was impossible to successfully manufacture machines unless under a proper license, and there was absolutely no way of escaping the royalties demanded by the owners. This was such a serious burden that it seemed, for a time, as if the business might be stopped, just as other lines have been interfered with by excessive demands for royalties.

Negotiations were immediately taken up with Richardson & McKee, with a view of securing an exclusive license to manufacture in the United States. A surprise was here encountered in the fact that an exclusive license had already been offered to Cunningham,

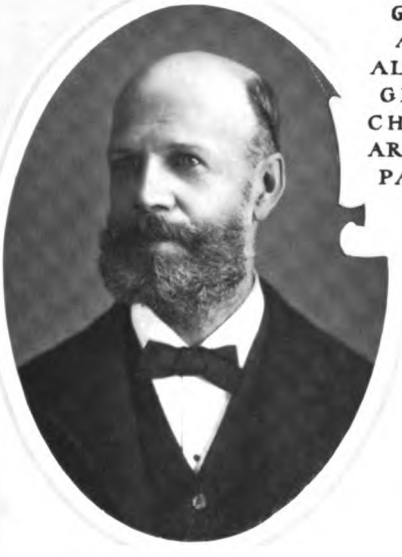
GROWTH and DEVELOPMENT

ALBERT L. POPE
Vice-President

CHAS. E. WALKER
Second Vice-President

DIRECTORS

WM. A. READ
COLGATE HOYT
F. S. SMITHERS
GEORGE F. CRANE
ALBERT A. POPE
ALBERT L. POPE
GEORGE POPE
CHAS. HAYDEN
ARTHUR W. POPE
PAUL WALTON



GEORGE POPE
Treasurer

WILBUR C. WALKER
Secretary

Heath & Co., a rival firm in Boston. For some unknown reason this concern failed to take prompt advantage of the offer and allowed their option to expire, and in the meantime the Pope interests were so strongly pushed that it resulted in the issuance of a joint license to both concerns. After some time it was discovered that although Richardson & McKee managed the entire patent they owned outright only a half of it, and the other half was held by the Montpelier Manufacturing Company, in Vermont. This caused another diplomatic campaign, during which numerous conferences were held with Richardson & McKee, resulting in the sale by that house to the Pope Manufacturing Company of one-half their interest, that is, one-quarter of the patent. There is no doubt that in selling this fractional share, Richardson & McKee intended to take the considerable amount paid them and with it purchase the half interest held by the Montpelier Company, so that they would still control the situation.

Such was their intention, but no sooner had the transaction been closed with Richardson & McKee, than Colonel Pope took the first train to Montpelier, arriving there twenty-four hours before the letter of those who had thought to outwit him. Had they been alert enough to send a representative instead of trusting to mail service the whole course of the history of the Pope Manufacturing Company would have been changed.

A meeting of the directors of the Montpelier Manufacturing Company was immediately called in the parlor of one of the local hotels, and here the president of the Pope Manufacturing Company laid before them his proposition. He aroused their interest and sympathy in the efforts he was making to develop this line of business in America, and showed them so clearly the folly of increasing the difficulties, and pleaded with such eloquence for the success of his cause that they finally sold him outright their half of the patent. This was a decisive victory all along the line as it put the Pope Manufacturing Company in absolute control of the essential patent; and as Richardson & McKee realized at once their situation and the futility of any contest, they came into line and sold to the Pope interests their remaining share in the patent.

Although the Pope Company now had a practical monopoly in this line of manufacture it showed a broad and liberal view in issuing licenses to all those reputable concerns that chose to engage in the same industry. It even included in these licenses one to the old rivals, Cunningham, Heath & Co.

As illustrated in this transaction, the Pope Manufacturing Company's policy has always been to foster whatever industry it is interested in and to build up and extend its business, not by pulling others down, but by doing all in its power to increase the demand for goods, and then bid in the open market for the business. Such a broad platform could not fail to attract the favorable attention of all those in similar or kindred lines of manufacturing, and this one policy consistently followed has won renown and favorable reputation for the Popes throughout the civilized world.

It was not long after the settlement of this blanket patent that the Pope Company was assailed on all hands by people claiming to own patent devices which were essential to the manufacturing industry at that day and numerous patent suits were instituted. Here again, great wisdom was shown in obtaining control of all patents, great and small, which had a bearing upon this particular industry, so that the control of the Pope Manufacturing Company could be complete and the interests of the industry properly protected.

The criticisms of rival manufacturers were at times severe and unjustifiable, as clearly shown by the results of the leading suits in these patent matters, the decisions of all of which upheld the position of the Pope Manufacturing Company, and the wise policy in handling the entire question was strongly emphasized in the fact that after many of these patents had expired, the price of the manufactured product actually rose instead of falling off as would naturally be expected.

While the company was organized with the nominal capital of $100,000, it was within a few years increased to $1,000,000. The patents secured during the first two years were valued at $40,000. The head offices in Boston were moved successively from 87 Summer Street to 597 Washington Street, to 79 Franklin Street, and finally, in 1892, to the newly constructed Pope building, 219-223 Columbus Avenue, where the whole edifice (five stories high) was devoted to the Pope interests.

Thus, through the devotion to one idea, through untiring efforts to bring that idea to perfection, and through consistently following sound business principles, the Pope Manufacturing Company, which at the start had scarcely any resources save the energy of one man, came to be the largest industrial concern of its class in the United States, and in the world.

Financing at the outset was difficult. Payrolls at the factories, head offices and branch houses increased with leaps and bounds, and the character of the enterprise was such that funds were outpouring during about eight months of the year, but came in with a deluge when the spring months began to move the manufactured product. Once the finances were straightened and credit established and the patent matters were well in hand, the president found more time to attend to his Good Roads problem. This was to him both a needed reform and a cold business proposition. If $10,000 expended in advancing the Good Roads movement bring $10,000 more business, and many times that value to the general community, the cause is a wise combination of business and philanthropy. This was the doctrine concisely put, and in following it out the company reaped hundreds of thousands of profit and the country millions of benefit.

In 1892 a systematic plan was adopted, and under the personal supervision of the president, and with the cooperation of an ample corps of assistants, upwards of $20,000 a year were spent in an educational campaign which had for its object the thorough discussion of the problem by the best men in the various walks of life.

The newspapers and periodicals throughout the country took up the question as a timely topic, and their columns were open to and received able contributions from all quarters. Judges, lawyers, professors, presidents of colleges, railway magnates, farmers, and many others added reason to reason until the people at large were persuaded of the advisability of road reform, and the only mooted question was the method of procedure, and this, together with other phases of the question, was very thoroughly covered by Colonel Pope in his numerous addresses before Chambers of Commerce, Boards of Trade and other influential organizations.

Once the press of the country was in line and the people's interest had been thoroughly aroused, a monster petition was launched, and with its hundreds of thousands of subscribers was presented to Congress, which gracefully bowed to the popular demand and made an initial appropriation of $10,000 to investigate the whole subject of good roads and collect and

distribute such information as would be of benefit in helping the different sections of the country to secure proper highways, and insure their maintenance under the supervision of skilled road engineers. This federal appropriation stamped the reform with governmental approval, and in a very short time states were appointing highways commissioners and legislating for better roads.

Here again was a campaign carried to a successful issue, for since that first appropriation millions of dollars have been expended by the various legislatures in building and maintaining public highways. While the Pope Manufacturing Company stood all the expense and for a time did all the active work, every trade and industry, directly or indirectly dependent on good roads, reaped a marked benefit, and the market for Pope goods was broadened many fold.

It is an interesting feature of the Pope campaigns, not exactly a part of the good roads work but kindred to it, that Colonel Pope furnished the funds for carrying through the courts such suits as opened Fairmount Park, Philadelphia, and Central Park, New York, and other reservations for the free use of wheelmen.

The many years' experience in manufacturing mechanical vehicles was the school which so thoroughly fitted the Pope Manufacturing Company to take the lead in the automobile industry. Its large force of artisans and the corps of engineers, designers and mechanics stood ready, mentally and physically trained, for just such problems as were to come up for solution. There are men connected with the works that have grown up from boyhood and know no other employers than the Pope enterprises. Many of the leading men have been in the same plant since the days of the Weed Sewing Machine Company. Think what that means when you come to the consideration of the value of an organization! How much does that count for in the guarantee of quality which goes with the Pope name-plate, and when one also comprehends that an equally thorough organization takes care of the mercantile end of the business, covering both domestic and foreign trade, no further argument is needed to insure an appreciation of the stability of the entire concern, and that in itself means steady trade, if not an increased trade.

A wise man makes his financial connections with the banking house that has the best facilities for doing that line of work. An Englishman, a Frenchman, a Russian or an Oriental merchant does not hesitate to do business in America through the best banking establishments of our leading cities. He knows at the outset that the facilities and valuable experience of these concerns are at his command. In a similar way the purchaser of American manufactured products, whether he be Caucasian, Coptic, or Malay, looks to the house whose stability is the result of years of experience, whose skilled force of managers and trained employees can smooth out all the perplexities of foreign trade and land at his door the right goods, at the right time and at the right price. In other words, he pays for his goods and gets them.

It is for these reasons that the Pope Manufacturing Company has always been so successful in foreign trade. The foreign department knows how to arrange transportation, payments, customs, credits and all the other elements which must be rightly handled to facilitate trade, just as the general sales department has been trained by many years of actual business to put through in the simplest and best way all domestic business.

Some years before automobiles were seen on the streets of American cities, the Pope Manufacturing Company established a "Motor Carriage Department," for which a special

building was erected, and a regular organization formed. Here, under proper supervision, were carried on some of the earliest and most important experiments in electric-driven automobiles, and the whole problem of horseless carriages was studied with zeal and thoroughness. Even in those early days, Colonel Pope made the prediction that automobiles would in a large measure supplant horse-drawn vehicles in the congested centers of trade.

The Pope Manufacturing Company, as organized to-day, is a corporation with a capital of $22,500,000, operating in its own name the famous plant at Hartford, Connecticut, a factory at Westfield, Massachusetts, and one at Hagerstown, Maryland. It also owns all the stock of, finances and supervises the Pope Motor Car Company, a subsidiary organization which operates two factories, one at Toledo, Ohio, and the other at Indianapolis, Indiana. The same plan also applies to the operation of the Columbia Steel Company, of Elyria, Ohio, a separate organization, all of whose securities are held by the Pope interests.

The products are various in kind and numerous, but the completeness of the plan of operation makes the wheels of business run like clockwork.

Each plant is in the hands of a manager and an assistant manager, trained in Pope methods and in the company's requirements, but from the executive offices in Hartford issue all orders affecting business policy, and there, too, are decided in conference with the officers and heads of departments all vital questions of both the manufacturing and mercantile ends of the enterprise.

The duties of active officers, managers and business associates are absorbing, and frequent conferences are necessary to a thorough and mutual understanding of plans and methods. From Toledo come the famous mile-a-minute Pope-Toledo gasoline cars — high-powered machines, high-priced products. From Hartford are sent out the well-known Pope-Hartford gasoline touring cars that have won the leading place among the moderate-powered American machines; at Hagerstown are manufactured the Pope-Tribune gasoline cars, constructed to meet the peculiar needs of those who delight in the use of a light-weight touring car, either with tonneau or in runabout type, and at Indianapolis are built the Pope-Waverley electrics in many different models for both pleasure and commercial use. In addition to all this the company puts out from Hagerstown and Westfield many thousands of bicycles annually.

Could such products be made without system in every branch of the industry? Doesn't the mere enumeration of the different kinds of articles made carry with it the inference that they are made right, and that that necessitates a stable organization built along well defined lines, safeguarded by years of experiment and experience, and embued with an *esprit de corps* unsurpassed in military, governmental or civil life? This is a reasonable explanation of the fact that the Pope name sells automobiles as well as it sells bicycles all over the civilized world; that wherever a Pope product appears it is a standard — it leads!

Executive Headquarters

THE executive forces of the various Pope plants and auxiliary companies mentioned in a previous chapter, and elsewhere described at length, center in Hartford, Connecticut.

The plant of the Pope Manufacturing Company at Hartford is situated but a short distance west of the center of the city. The visitor to the Pope works passes the stately and magnificent state capitol, surrounded by a spacious and extremely beautiful park, and soon after finds himself at the Pope plant—an industrial city in itself. He will be surprised to find that the Pope headquarters are not housed in ordinary buildings such as factory offices generally occupy, but are specially provided for in a large office building erected solely for that purpose.

This structure is dignified and attractive in its style of architecture, and is built of light brick, three stories high, standing back at a distance from the street and separated from it by a grassy, well-kept lawn. This building was planned, erected and equipped with a special view to the needs of the officers and the various executive departments of the Pope Company.

Executive Offices, Hartford, Connecticut, U. S. A.

EXECUTIVE HEADQUARTERS

It is roomy, light, airy, arranged with an especial view to comfort and convenience and contains every device for the conduct of business along modern lines. Outside and in, it is an example of dignified elegance.

It is sufficiently apart from the factory buildings to be quiet and to present no objectionable features. It is as much alone as if it had no connection with the factories. There is room enough for everybody. There is no noise or confusion, and a tremendous amount of work is daily done in a manner which insures the maximum of results with the minimum of apparent effort.

From the basement to the roof this building teems and throbs with the spirit of the Pope enterprise. Below ground, records, letter files and documents of all kinds are so arranged that any particular paper may be secured promptly when required; and in fireproof vaults, running up two stories, are kept books of accounts and valuable papers of various kinds.

The ground floor is entirely given up to accountants—the heads of departments and their staffs of assistants. Here two large, well-lighted rooms are filled with busy clerks.

The second floor, with the exception of three private offices, is one large room which takes up the entire front of the building. In this room the detail work of the general sales and agency departments is cared for; this being true of both the bicycle and automobile branches of the business.

The casual visitor to the various executive departments housed in this building invariably notes the systematic manner in which all the work is done and the zeal and intelligent interest displayed by all the employees, from the oldest to the youngest.

Some years ago the officers of the company made a careful study of the important subject of departmental work, having in mind both the comfort of the employees and the efficiency of their labor.

It has been demonstrated to the satisfaction of all concerned that the contentment of the working force is an essential element in insuring the best cooperation, a result that, from an economic standpoint, is worth all that it costs in dollars and cents. It is claimed also that there is no better way to foster that valuable spirit of loyalty which has from the inception of the enterprise characterized the Pope forces. Evidences of this policy appear not only in the magnificent office building as a whole, but in the detailed arrangements for the convenience of each man's work.

Executive Offices

ON the top floor of the office building described in the previous chapter, Colonel Albert A. Pope, president of the company, occupies a spacious corner office in which are held the numerous conferences and discussions with the other officers and heads of departments.

Colonel Pope's plan has always been to formulate the policy of the company, leaving the execution of all details to his associates and employees, thus developing initiative, executive ability and responsibility throughout the entire staff.

Albert L. Pope, first vice-president, has a room connected with the president's office by a small antechamber. He has been associated with the company for fourteen years, and his duties are numerous and arduous. All heads of departments make their reports to him, and all general orders come from him or the president. He is the active manager and directly in charge of the making and marketing of the Pope products, and travels much of the time, keeping in close touch with conditions at the various plants.

General Sales Department

EXECUTIVE OFFICES

Vice-President's Office
President's Office
Treasurer's Office

Second Vice-President's Office
Comptroller's Office
Secretary's Office

EXECUTIVE OFFICES

Charles E. Walker, second vice-president, has an office on the second floor of the building. Mr. Walker has grown up with the business from its early days and has passed through factory and clerical experiences until he has reached his present position, and this long and comprehensive training peculiarly fits him for the immediate supervision of the plants at Hartford, Westfield and Hagerstown. He is a tireless and intelligent worker, a man who knows how to handle other men, and, as may be imagined, a very useful officer of the company.

The treasurer of the company, Colonel George Pope, has quarters connecting with the president's room. He is in direct charge of the finances of the company and all of its subsidiary organizations. He has been with the company seventeen years and is the court of last resort on all questions of accounting.

Wilbur C. Walker, secretary, occupies the office adjoining that of the second vice-president. He has immediate supervision of the sale of the automobiles made at Hartford and Hagerstown. With his twenty years of commercial training he is peculiarly well fitted for this important department of the business. He is himself an automobile expert—knows a car in every detail. He has been with the company from boyhood and has had a wide and exceptionally valuable experience.

GENERAL OFFICES

Cashier's Office

General Accounting Department
Foreign Department

Stenographic Department

BY far the largest part of the space in the general offices is devoted to the clerical force under the guidance of trained departmental heads, who are experts in their several lines.

Robert M. Beck, Chief Engineer, began his work for the company in 1891. He is a man of varied experience, whose judgment is a valuable aid in consultations with the officers and those whose opinions and influence determine the important questions of factory equipment and new machinery, the plans for all of which go through this department for approval

H. A. Lienhard, Manager of the Foreign Department, entered the company as office boy and has been in charge of the important export business for a quarter of a century. He has a competent and well organized force of assistants, and has collected valuable information about foreign trade, credits and the best available outlets for Pope goods on the other side of the ocean.

Robert L. Winkley joined the forces of the company in 1892 in the capacity of confidential secretary to the president. His duties, from the outset, brought him into intimate relations with the inner workings of the concern, and his daily contact with the executive force particularly fitted him to comprehend the policy and scope of the entire enterprise. As

Chief Engineer's Office

Patent Department

the president has from the beginning taken a lively interest in all advertising matters, Mr. Winkley in time became the natural candidate for manager of the department of publicity, a position which he has filled for several years past.

F. C. Gilbert is manager of the Jobbing Department. His experience of many years with the company has made him familiar with the numerous departments of the manufacturing and mercantile ends of the business, so that he has developed expert judgment in the handling of the particular work entrusted to his department. He devotes his attention to the sale of bicycles in quantities to the jobbers throughout the country.

J. F. Cox, Superintendent of Agencies, has been advanced gradually from the accounting department through the various other mercantile branches of the business to his present position, which is one of responsibility, as he has under his immediate charge the care of all the bicycle dealers in the domestic trade. His force of assistants is large and well organized, each correspondent being assigned a definite territory and all reporting to the superintendent for guidance.

G. W. Morrow, Comptroller of the Corporation, is a right-hand man for the treasurer and looks after details of the accounting department and cost system. The auditors are also in frequent consultation with the comptroller as well as are also those working on the cost system.

The Patent Department is a valuable adjunct to the Pope forces. It was organized for the purpose of determining the probable patentability of inventions made by experts in the company or offered by outsiders for consideration. This is probably the best-equipped private patent bureau in the country and its files of information are conveniently arranged for ready reference, a matter of inestimable value in the event of protecting patent rights in the courts or in answering patent claims that so often culminate in suits. The treasurer watches with particular care this branch of the work and also the fire and other insurance of the entire company.

The Auditing Department keeps a duplicate set of accounts for each agency department in the field, checking by the trial balances at the end of every month. The traveling auditor visits the various accounting departments at least twice a year and makes his reports direct to the treasurer. The books of the entire corporation are audited annually by a firm of chartered public accountants.

The Cashier's Department examines all bills after they have been duly approved, draws checks for payment of same and has direct charge of all incoming and outgoing funds and attends to payrolls and various other matters of importance.

The Purchasing Department has an exceedingly exacting line of work. The plan of having one man supervise the purchase of stock and supplies has resulted in large savings to the company and its numerous branches. The purchasing agent secures the best rates and discounts by buying in large quantities, and his files of quotations, kept well up-to-date, are an effective and accurate assistance in measuring prices.

Department of Publicity

Robert L. Winkley . . . . . *Manager*

FROM the time of its foundation the Pope Manufacturing Company has been a firm believer in the persistent use of printers' ink, and its extensive advertising has made its name known in every corner of the civilized world.

It is of course true that no amount of advertising can permanently sell an unworthy article, but it is equally true that good advertising is essential to the full success of a worthy article.

The Pope products have, without exception, proved reliable and superior, and wise and expensive advertising has constantly and persistently made known their merits. The

Manager's Office

PUBLICITY DEPARTMENT

Composing Room, Printing Department
Press Room, Printing Department

PUBLICITY DEPARTMENT

manager of the department is in close touch with the executive as it is necessary that the advertising keep pace with the general progress of the company and be in harmony with its laws and purposes.

In this department are written or edited all advertisements, catalogues, instruction books, leaflets and other literature, whether exploiting bicycles, motorcycles, Pope-Toledos, Pope-Hartfords, Pope-Tribunes or Pope-Waverley Electrics. It is also a clearing house for the news of the combined Pope interests, both regular and special contributions being sent to trade and class publications and to the newspapers throughout the country.

A systematic record of press clippings and other results of this work makes it possible to place comparative values on the various kinds of publicity outside the realm of direct advertising. The plan of distributing advertising matter to dealers, including electrotypes, suggested typographical settings, decorative borders, photographs, blue prints and a variety of designs is of material assistance in making local advertising conform to the company's ideas and thus reinforce the national publicity campaign.

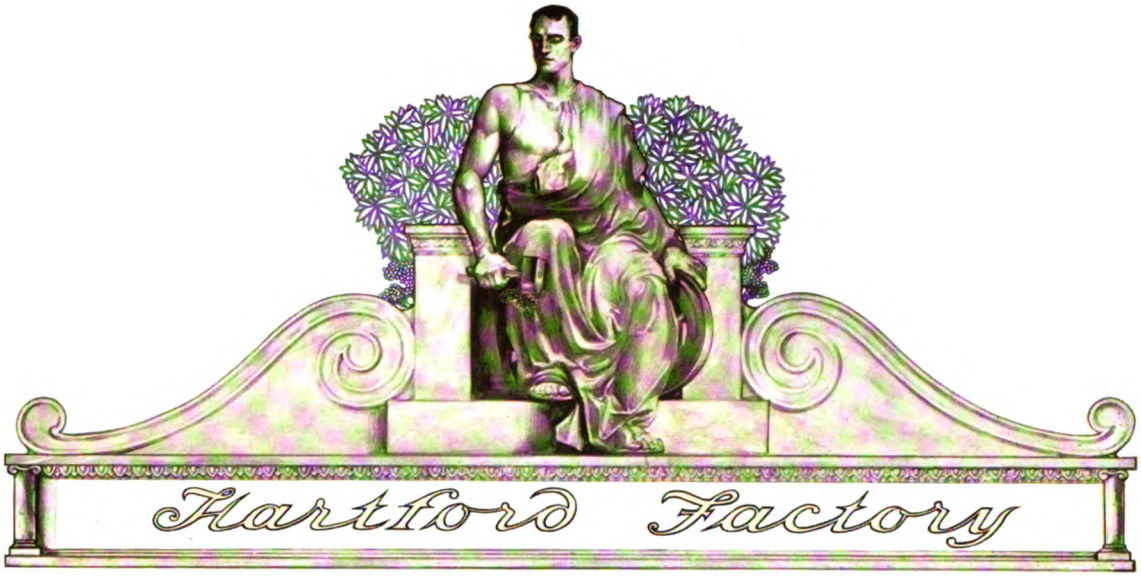
The exploitation of Pope products, as accomplished by direct advertising in the various mediums of national circulation, is constantly supplemented by the interesting and newsy publicity which is a natural accompaniment of the automobile shows, national and international races, hill-climbing events, cross country runs, tours, etc.

The details of these contests appeal to the reading public and are of value particularly in the columns of the American daily and weekly newspapers as well as in the illustrated periodicals. It is one of the functions of this department to supply interesting press reports together with attractive photographs for illustrations so that the public may be promptly and correctly informed about the achievements of Pope automobiles, bicycles and motor bicycles.

Any bit of news that in an ethical way adds to the Pope reputation is spread far and wide, it being the general policy to so maintain the intimate association between the name "Pope" and automobiles, bicycles and motor bicycles that the prospective purchaser will never fail to ask for the Pope line.

HARTFORD FACTORY

Factory Office
Draughting Room
Superintendent's Office



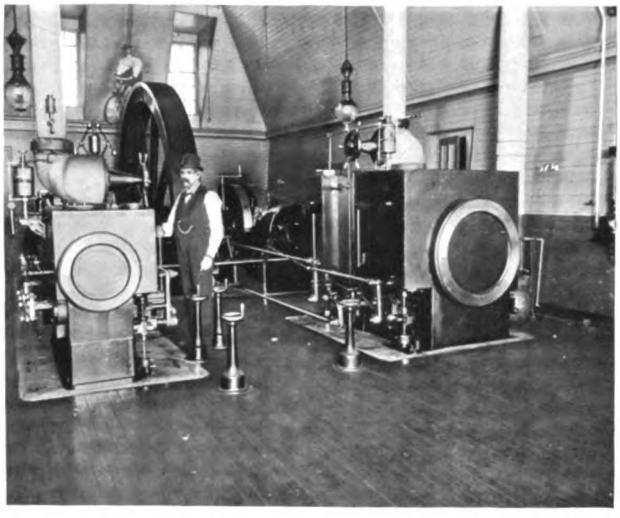
THE Hartford plant of the Pope Manufacturing Company comprises twenty-six buildings, exclusive of the office building, with a floor area of nearly 400,000 square feet, and is devoted exclusively to the manufacture of Pope-Hartford gasoline touring cars and commercial trucks.

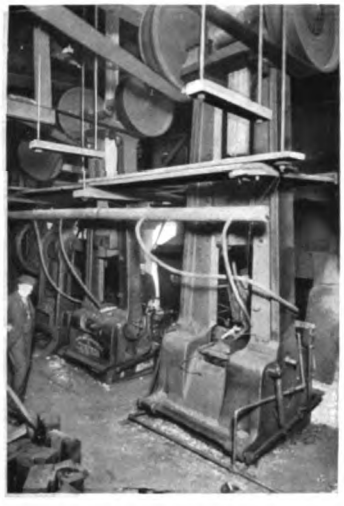
These buildings are all of modern construction and include two fireproof storehouses, with a floor space of about 15,000 square feet.

The plant covers a tract of several acres, tastefully laid out and adorned with trees, shrubs and flower beds. All buildings are heated by a modern blower system and lighted by electricity, supplied from the company's own plant, which consists of three direct-connected upright engines of 100 horse-power each. The power for manufacturing purposes is secured from three engines—one cross-compound of 600 horse-power, one 100 horse-power and one 75 horse-power, making a total of 775 horse-power. Electric motors are installed in the most important departments for use in overtime work, or in case the steam power apparatus is for any reason temporarily stopped.

The Pope-Hartford touring cars, which are made at this plant, rank foremost among American automobiles, although they are sold at moderate prices. They are designed and

HARTFORD FACTORY





Engine Room

Boiler Room

Drop Forge Shop

constructed with a view to general every-day use, at the hands of their owners, offering the highest degree of reliability and satisfaction.

It is apparent even now that only the initial steps in the industry have been taken; it promises to grow for many years to come. This statement particularly applies to the future of the commercial wagon, to which this company is now devoting much attention.

In all branches of its work the company recognizes the advantage of manufacturing, so far as is possible, all the component parts of the complete car instead of depending on other manufacturers and becoming merely assemblers. At the very inception of the automobile enterprise, it put into execution plans for manufacturing the car from the ground up, thus obtaining complete control of production and being assured by actual test that each and every part of the machine, down to the smallest detail, is up to the rigid Pope requirements.

The most modern machinery, together with special fixtures and tools, are used in all the shops, many being especially designed to manufacture some particular structural element of the automobile, thus insuring absolute interchangeability of parts. All parts of a machine are tried and tested practically by a rigid inspection and comparison with gauges until perfect. After the battery of individual machines required for turning out the various intricate parts desired is set, any number of interchangeable parts are readily produced. This is a very important feature and demonstrates the superiority of American automobiles over the European product. This system of making parts interchangeable was first used in the manufacture of sewing machines, then of firearms, next of bicycles and finally of automobiles.

Before work is begun on the individual parts of a car all important material is analyzed and tested by an expert metallurgist and chemist.

The hard service required of all the parts of a gasoline engine demands the greatest durability combined with the minimum weight. The materials involved are selected with this end in view, a peculiar composition of strong iron being used for cylinders and pistons; special grades and alloys of steel for crank shafts, connecting rods and other moving parts, and high-grade aluminum in the crank cases and dust-proof covers. The most approved

Steel Stock Sheds

HARTFORD FACTORY

Annealing and Heat Treatment Department
Machining Parts
Pattern Shop

Milling Department

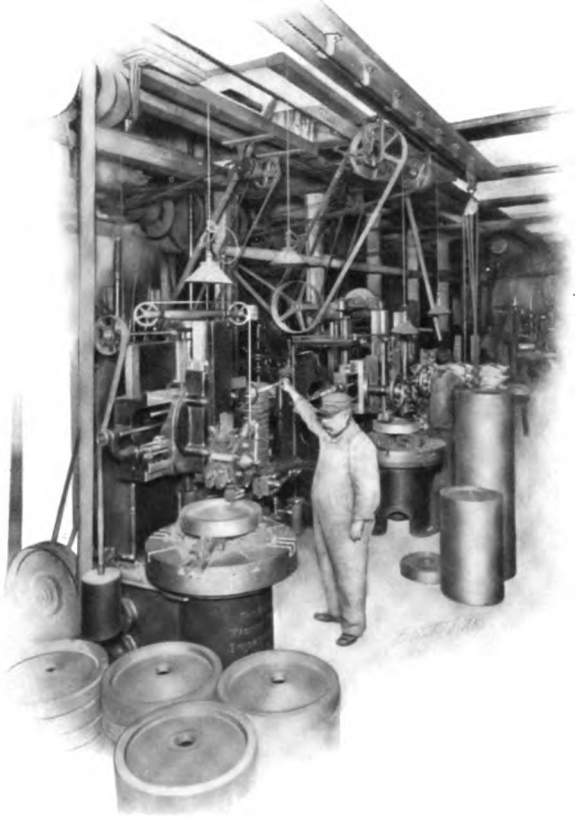
mixtures of phosphor-bronze, swaged and carefully hand-fitted, are used in all bearing bushings. Almost everything except the metals themselves is made in the factory.

The rough stock consists of steel, bronze, aluminum and cast-iron. Steel is first inspected for dimensions, and specimens are clipped off at random and given to the department of tests for chemical and physical analyses. The chemical test consists in powdering samples, which are subjected to acid and heat tests, until the elements are correctly determined.

Nickel steel and other special alloyed steels are used throughout the machine. Formerly, steel in its annealed condition, or the condition in which it came from the rolls or hammer, was considered good enough for use in automobile parts. It has been learned since, however, that a better condition is that resembling a well-tempered spring or tool. Therefore much steel put into cars undergoes what is known as the "heat treatment." Heat treatment is subject to a wide range of variation in method, and must be modified to suit the different materials treated and the different purposes for which the material is to be used. It is no exaggeration to say that the strength of steel may be increased two and three fold by heat treatment, and it is by such methods that parts are brought up to the necessary high standard.

That the Pope Manufacturing Company has earnestly set itself the task of producing the most perfect automobile in existence is a fact which immediately becomes self-evident to the intelligent visitor at the Hartford factory. Not only will it be found that the various shops are splendidly equipped with a complete outfit of machinery necessary for the several lines of work to be done, but also that the newest and most perfect appliances obtainable are in constant use. In fact, several of the most important machines were expressly designed for use in this factory.

The visitor to the Pope works, be he the expert in things mechanical or the casual sightseer in quest of new sensations, experiences a series of veritable surprises. The things done, and the ease with which they are done by machines that all but think, give one a new and impressive sense of the greatness of modern inventive genius. In one room is seen the specially-designed machine for boring cylinders and drilling valve seats. It is capable of boring four twin cylinders at once, twenty-four in a day of nine hours, accomplishing



Machining Fly-wheels

HARTFORD FACTORY

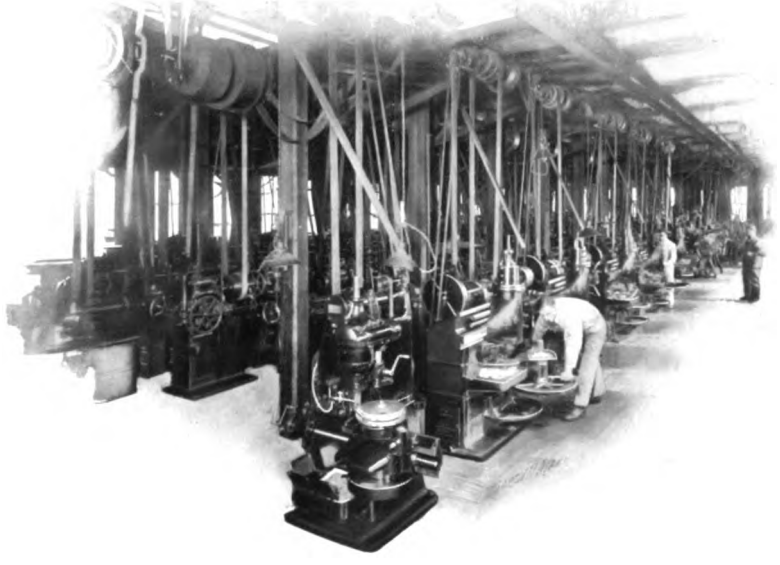
Chucking Machine Department
Die Sinking Department
Boring Transmission Cases

Grinding Department

in that time what a hand worker would require over three weeks to perform. There is no other machine like it in the world, and there will be only one other when its duplicate is installed in the Pope factory at Hagerstown. There are to be found here other borers in plenty; a battery of borers for engine, transmission and differential gear cases, also built especially for the Popes and capable of the neatest and most rapid work; other machines for working engine fly-wheels, endowed with the greatest and most exact working capacity, and turning each wheel to perfectly true and evenly balanced proportions.

Of equal interest are the grinding machines for finishing the surfaces of all varieties of round work, revolving shafts and other nicely-fitted parts, requiring a clean fit and accurate shaping. Other specially-designed grinders surface the bores of cylinders in a manner unequaled by any other known process, contributing a goodly share to the mechanical perfection of the Pope-Hartford automobile. So far as is known the Hartford factory is the first in America where gas engine cylinders were ever finished by grinding. This was done on motor bicycles in 1900. Since then this method of finishing cylinder bores has been adopted by leading makers of automobiles who have installed specially-designed machines for performing the work.

Perhaps even more impressive are the batteries of great hammers used in drop forging various essential parts of the mechanism. The largest of these weighs 3000 pounds, one and a half tons; the next in size is the 2200-pound hammer, and there are others of less weight. These hammers do the heavy forging necessary in the production of the many curiously-formed pieces that go to make up a high-grade automobile. In practice one die is fixed in the bed of the forging machine and its companion is attached to the bottom of the massive hammer. This hammer is raised by belts and pulleys and a system of gearing and is held at a desired height by means of a lock. The piece to be forged is heated and placed on the



Gear Cutting Department

HARTFORD FACTORY

Model Department
Tool Department

Nickel and Brass-plating Department

Sheet Metal Department

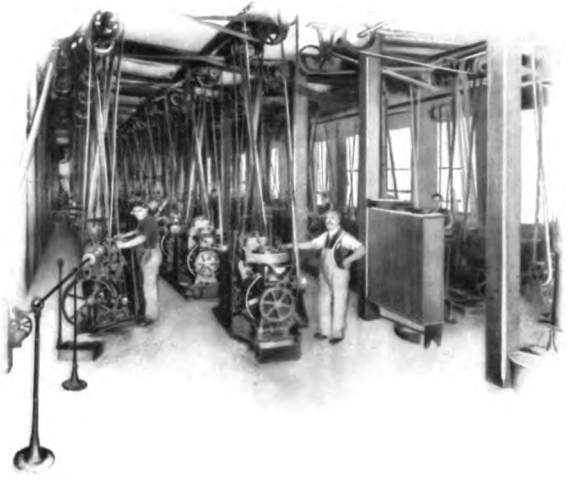
lower die. The operator then puts his foot on the treadle releasing the hammer, which falls with a blow of thousands of pounds, variable according to the height to which the hammer is raised. Immediately after the blow is struck the hammer is automatically raised by means of the overhead mechanism and comes to a stop on the locking device. A few blows of this massive hammer will shape a piece of steel weighing forty to fifty pounds into a form impossible for hand forging to produce, as the material is forced into the impressions cut in the dies, and the result is an exact reproduction of the cavity. At the present time parts are successfully forged up to the length of a front axle.

The die sinking department is a necessary adjunct of the drop forging department. Its work is of a peculiar nature, very nearly approaching art, as a die sinker, to be efficient, must be able to take a drawing of a certain piece to be forged and carve out in the steel blocks the two corresponding depressions that will produce, when placed under the drop hammer and filled with hot steel, a result exactly shaped and dimensioned according to the specifications of the drawing.

This requires the ability to work very accurately to measurements, and much of the work must be done by the eye. A certain amount of scientific knowledge is also required to allow for the shrinkage of the forged metals in cooling, the shrinkage being largely influenced by the size and form of the work produced. Some of the work made in metals by die sinkers compares favorably with marble sculpture. The machine equipment in this department is of the most approved type.

The gear cutting department is particularly interesting to visitors. It is devoted to the manufacture of the various kinds of gears used in automobile construction, including spur gears, gear sectors, bevel gears and pinions and spiral tooth gears. The steering worms are also made here, as is the steering gear case which encloses the worms and sectors.

There is one especially designed spiral gear cutter in this department that is almost human in its operation, also two special machines for cutting bevel gears. These machines



Automatic Screw Machine Department

HARTFORD FACTORY

Chassis Painting Department
Engine and Transmission Assembling Department
Upholstering Department

can cut a bevel wheel up to eighteen inches in diameter, and in the most accurate manner. A wide range of other special and important work, such as frame fittings and transmission parts, is done in this department.

Even more interesting to the visitor is the screw making department, where may be seen in operation the wonderful automatic machine that feeds a steel bar, turns it down to any desired circumference, threads it to the required length, shapes its head and cuts off the completed bolt or screw, all in a single cycle of operations, quite without human assistance. There are over sixty of these machines and they produce most of the screws and bolts used in the factory, together with numerous other small parts, such as pins, bushings and some portions of the ornamental brass work of the finished car.

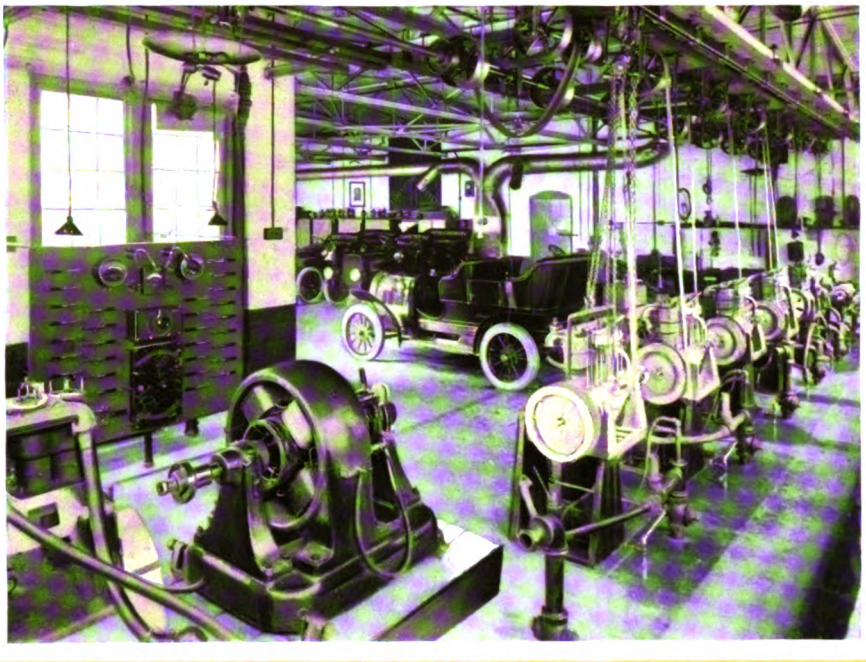
Not only does this factory produce all the various parts required in the manufacture of the complete automobile, but also the tools used by the workmen in making them.

The tools are made in the busy machine shop, which is equipped with the best lathes, planers, milling machines, drill presses and other appliances. On the horizontal boring machines, jigs and fixtures representing the highest accuracy in machine tool construction are produced. On every machine the most skillful tool makers in the country faithfully reproduce the designs of the engineering department.

Another room, filled with busy workers and even busier machinery, is the chucking department. It is mainly devoted to turret machine work, such as phosphor-bronze bushings, cups and cones for ball bearings, small shafts, valve seats and screws and bolts, which must

Chassis Assembling Department

HARTFORD FACTORY



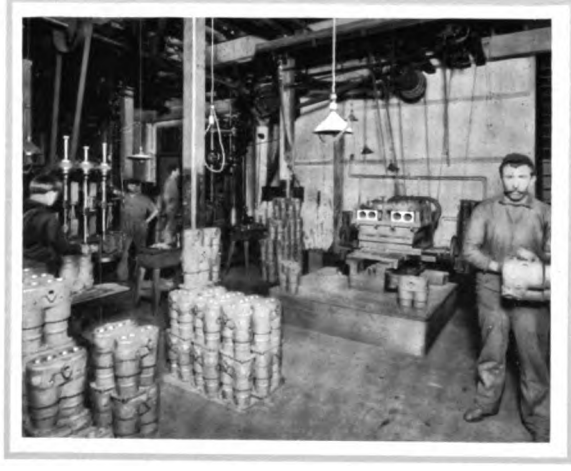
Engine Testing Department
Inspection Department

be made with accuracy. The machine work on the carburetors is done here, also that on nearly all the bearings of the automobile. Vast quantities of these parts involve the service of a large gang of men and a great number of turret machines and lathes, several of them specially designed for the intricate operations involved. Even with this extensive and important department we are not through with all the machine shops of the factory. The machining parts department produces a great quantity of round work from heavy bar stock, such as axle shafts, transmission shafts, countershafts, pivot bolts, etc. The steering pivots and the wheel hubs are also made in this shop, and brake drums, engine pistons, propeller shaft parts and many important forgings are finished here. The department is splendidly equipped with the latest type of flat turret machines, single and double spindle milling machines, drill presses and special machines for making pistons. One of these piston machines is capable of turning out forty-five pistons in nine hours.

Passing out of the machine shop we come to the inspection room, in which all manufactured work is subjected to an inspection of extreme rigidity. Some parts are even examined with magnifying glasses in order to detect any possible flaws, and all are carefully gauged for size and inspected for general workmanship.

The inspection room is probably the most important department of all. It is the safety valve of the entire establishment, most essential to the interchangeable-part system. In it are determined the exact dimensions of the vital parts down to the one-thousandth of an inch. One set of gauges, called a master set, is kept in a fireproof vault and never leaves the model and gauge department, being used simply as reference gauges to prove up two duplicate sets. One of these duplicate sets is in use in the factories to gauge work during production, the other set is used for inspecting the finished product. These gauges are carefully compared at frequent intervals with the master gauges in the gauge-making department, this work being done by an expert gauge maker, and if at any time a working or inspection gauge shows the slightest wear or

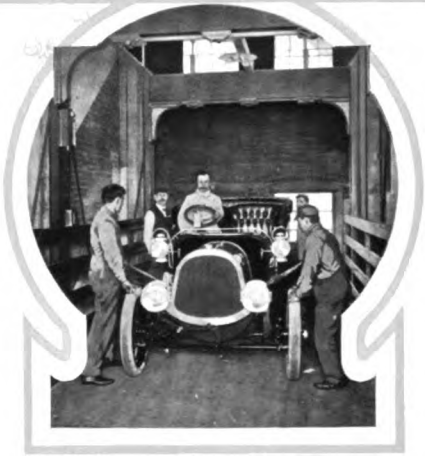
Cylinder Boring Department



Cylinder Grinding Department

HARTFORD FACTORY

Test Yard



Large Elevator

deviation from the master gauge, it is replaced or readjusted, as the occasion may demand.

The model and gauge room is an important department, where all the models of new designs are built, also the gauges in use in the factory, as well as the threading tools, such as taps and dies used about the works. Expert judgment is absolutely necessary in the various workmen who construct the models. They must possess the knowledge and ability faithfully and accurately to produce, to one-thousandth of an inch, parts that will conform, even to the slightest detail and degree, with the drawings sent from the designing room. Each separate piece of the working model must necessarily be the master piece from which the parts in the future are to be made. The importance of all this is evident when it is considered that the most valuable invention may oftentimes be abandoned as a failure if the working model proves disappointing, as may readily happen if it is not properly made. This department is equipped with high-grade tools, lathes with precision screws and graduated indexes, milling machines of the most elaborate kind to handle the large variety of work turned out, and the most expert mechanics in America to operate them.

The assembling of the engines, transmission gears and other machine parts, is done in a special department, the work of which is merely bringing together all the various parts and building them into a working whole.

Nothing is made in this department and no fitting is done, except the scraping of the bearings, fitting of the piston rings and grinding of the valves—this latter being done by a special machine designed and built by the factory. In this department the accurate construction of the automobile is very much in evidence; the cylinders with their smoothly ground bores, the pistons with their mirror finish, the spring packing rings, also with a ground finish, the nickel steel crank shafts, the connecting rods and stacks of bronze boxes, the bearings—all finished to such high accuracy and smoothness, and all so identically alike, that they may be taken up at random and placed in position in any machine and be found to fit perfectly. In this department are also assembled the axles, steering gears and carburetors. This floor contains probably the best display of accurately made automobile parts in the world.

From the assembling department each engine is taken to the testing room, being mounted on an iron standard, and driven by a belt for a period sufficient to "limber up" all

the parts. When the running is found to be sufficiently easy it is run under its own power for several hours, being then cleaned thoroughly and mounted on the power-testing machine. This is an electric generator and motor, especially built for this purpose by the General Electric Company, and in connection with the set of electric instruments on the switchboard enables power readings to be taken accurately within one-hundredth part of one horse-power. The uniformity of power development is thus carefully checked, and before the engines are placed in the chassis they are thoroughly proved up to standard power rating.

The chassis of cars are assembled with the same care and exactness as are the engines, transmission and other groups.

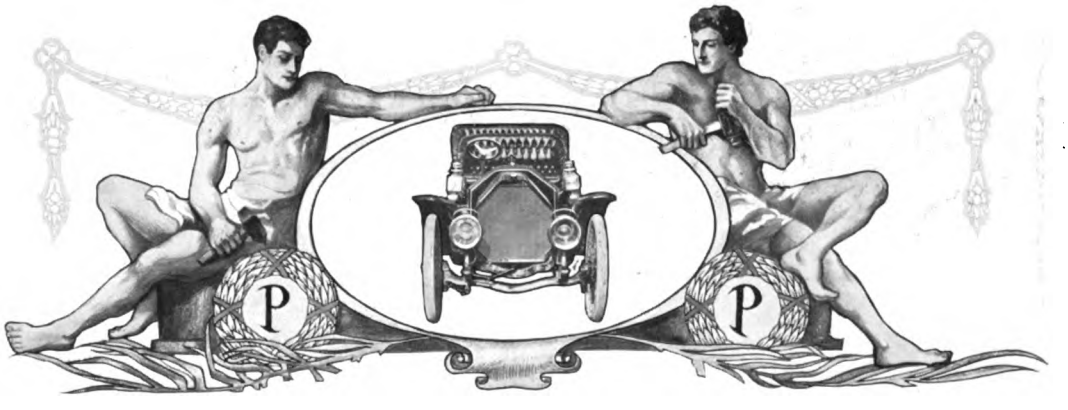
When the chassis leaves this department it is a complete car with skeleton equipment ready for road testing—containing engine, transmission, brakes, carburetor, radiator, steering gear—everything ready for a run on the road.

The test department receives the automobiles from the assembling department. Then they are taken in hand by drivers, experts thoroughly trained in the handling of automobiles, and worked out on the road. At this time adjustments are perfected. After the first day or two of careful running, when all the parts are in thorough working order, the car is put to a very severe road test. If difficulties develop during this hard run they are corrected and the car is operated and tuned up until it is ready for the inspector, who subjects it to a thorough and severe trial, intended to be a worse ordeal than it should ever pass through again. Not until his stamp of approval is on the ticket does the car leave the testing department for the paint shop.

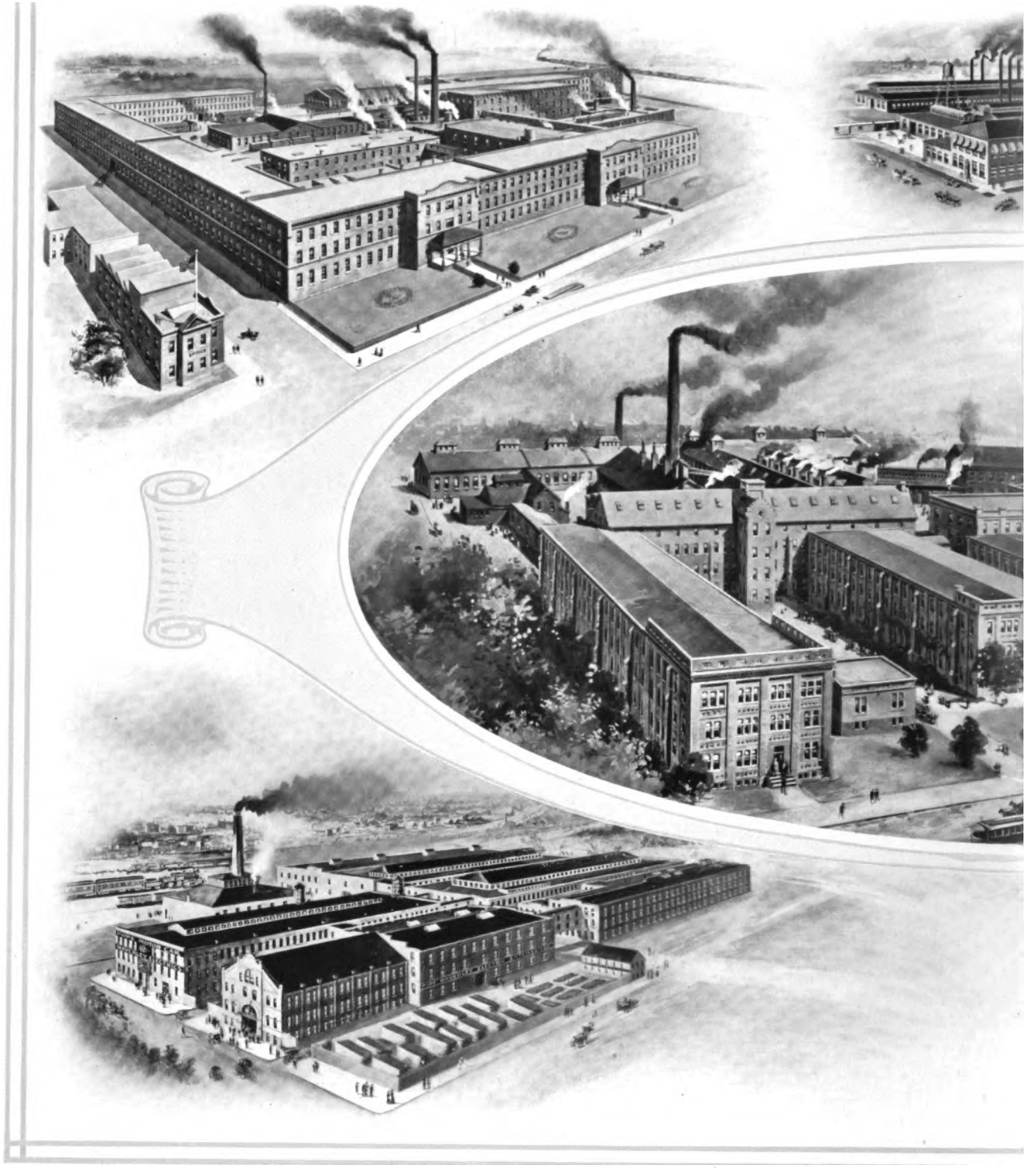
After the cars have been thoroughly tested out, have passed inspection as to their running qualities and have made their journey through the paint shop they arrive in the final assembling department. Here the new tires are put on and the bodies and hoods fitted, also the various automobile sundries and any special equipment that the consumer may desire. It is surprising how many conveniences have been devised for the comfort of the automobilist, and a high grade of skill is required in affixing them to the car.

Nothing on the finished car offends the eye. The effect is distinctive and attractive in every particular, both as to construction and finish.

The Pope-Hartford automobile is built like a watch. It is a masterpiece of designing skill and exquisite workmanship.



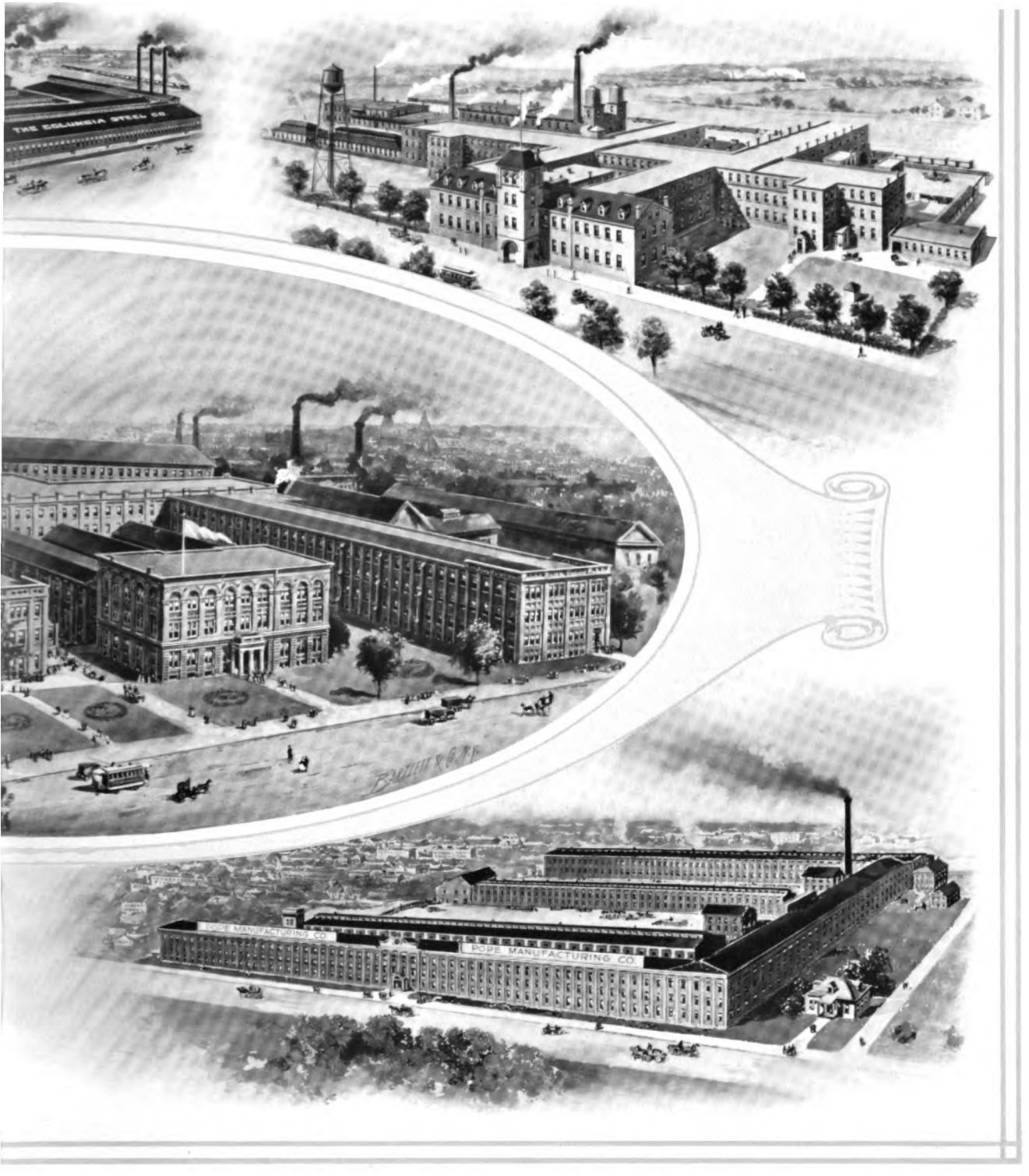
PLANTS OF THE POPE MA



Pope Motor Car Co., Toledo, Ohio
Pope Motor Car Co., Indianapolis, Ind.

Columbia Steel C
Pope Manufacturing

NUFACTURING COMPANY



..., Elyria, Ohio
...., Hartford, Conn.

Pope Manufacturing Co., Hagerstown, Md.
Pope Manufacturing Co., Westfield, Mass.

HAGERSTOWN FACTORY

Purchasing Department
General Offices

Manager's Office

Superintendent's Office
Assistant Manager's Office

Hagerstown Factory

Harold L. Pope . . *Manager* Harry S. Wise . *Assistant Manager*

THE plant of the Pope Manufacturing Company, at Hagerstown, Maryland, is located on historic ground—being a few miles from the Civil war battlefields of Antietam, South Mountain and Gettysburg, in the former of which the president of the company, Colonel Albert A. Pope, served with distinction as a lieutenant in the Union forces, and within a stone's throw of the main highway, over which the movements of the opposing forces were made.

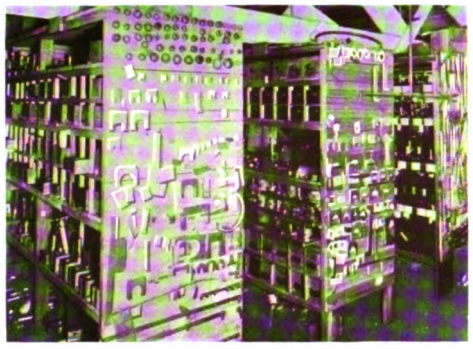
Hagerstown is a busy manufacturing center, and the location of the Hagerstown factory is especially convenient, both with reference to securing satisfactory labor and for quick and efficient shipping facilities.

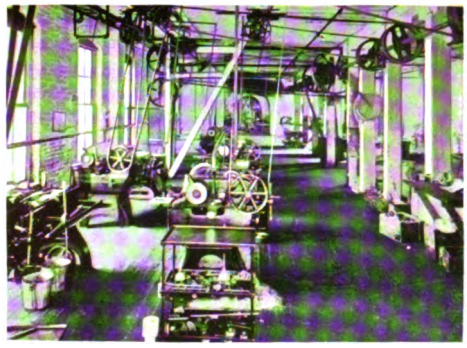
The factory is located on the Baltimore & Ohio Railroad system; has its own sidings, which permit the handling of freight directly in and out of the factory buildings, and also has switching connections with the Wabash and Pennsylvania systems. This factory has been designed with

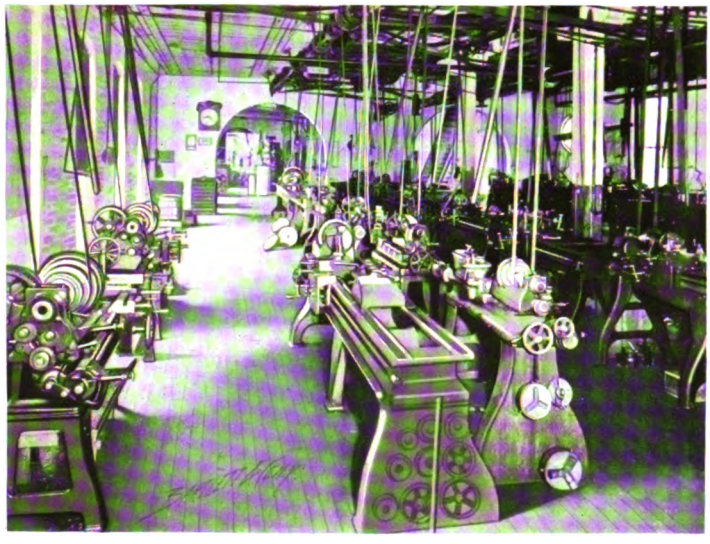
Water Tower

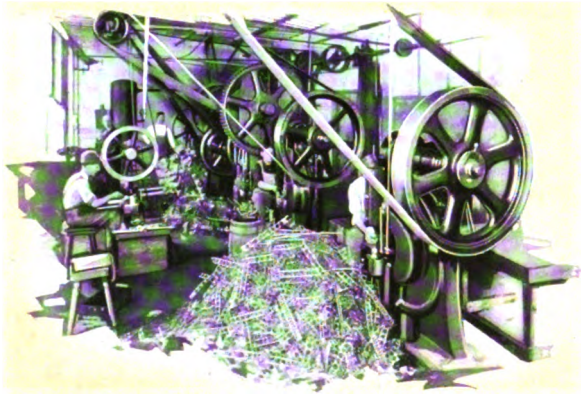
Office Entrance

HAGERSTOWN FACTORY







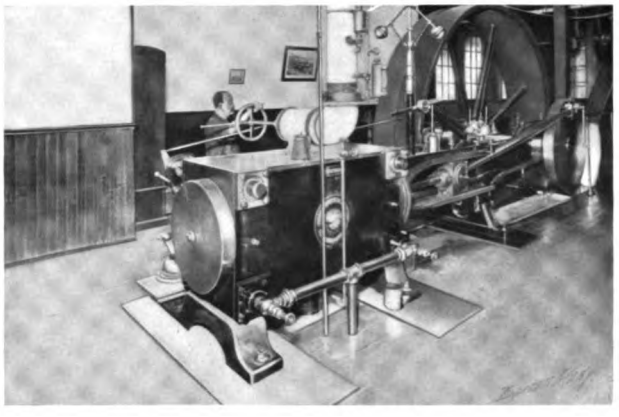


Tool Crib

Machine Department

Machine Department—another view
Punch Press Department

HAGERSTOWN FACTORY



Engine Room

special reference to the economical and accurate production of bicycles and automobiles in large quantities. The buildings are of modern heavy mill construction, provided with ample fire protection, and the whole plant is kept to the high standard universally associated with the properties of the Pope Manufacturing Company.

The aggregate floor space of the buildings is equivalent to more than three acres. In addition to this, the company owns large grounds surrounding the factory and ample provision has been made for future enlargements of the plant.

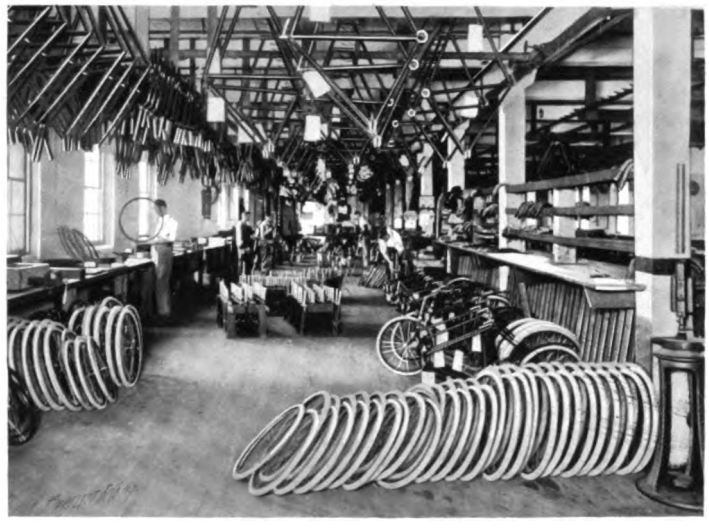
Following the policy of the Pope Manufacturing Company, which is to specialize the product of its various plants, the Hagerstown factory is devoted to the production of the Pope-Tribune four-cylinder cars, Juvenile bicycles and bicycles sold by the Pope Manufacturing Company to the wholesale and jobbing trade.

The general engineering and designing of the automobiles made in this plant is done at Hartford; where also is laid out the policy of operation for the other Pope plants. This arrangement has the advantage of standardizing the products of the allied factories, eliminating intercompetition and enabling the economical manufacture of various parts and accessories which other makers ordinarily purchase from outsiders.

The Pope-Tribune gasoline cars stand very high among cars of their class. They are noted for their hill-climbing qualities and their ability to stand hard usage over rough roads. The location of the Hagerstown factory has been of great assistance to the company, as all of the Hagerstown products

Drilling Machines

HAGERSTOWN FACTORY



Testing Oilers

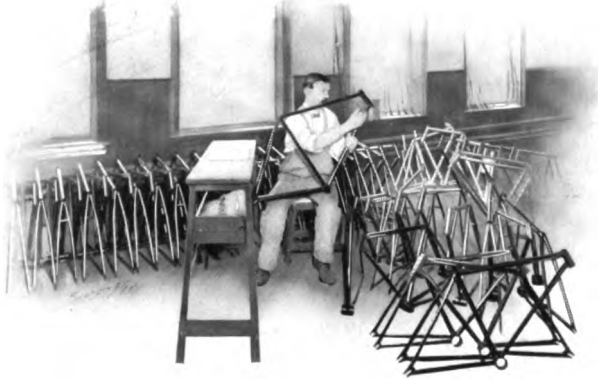
Bicycle Assembling Department
Automobile Assembling Department

Engine Assembling Department

are tested over the mountainous roads of that vicinity. In this way any structural defects in the models are revealed and the proper methods of construction determined. The Pope-Tribune car has been successful in a number of strenuous tests and among others won a certificate in the Glidden Tour of 1904.

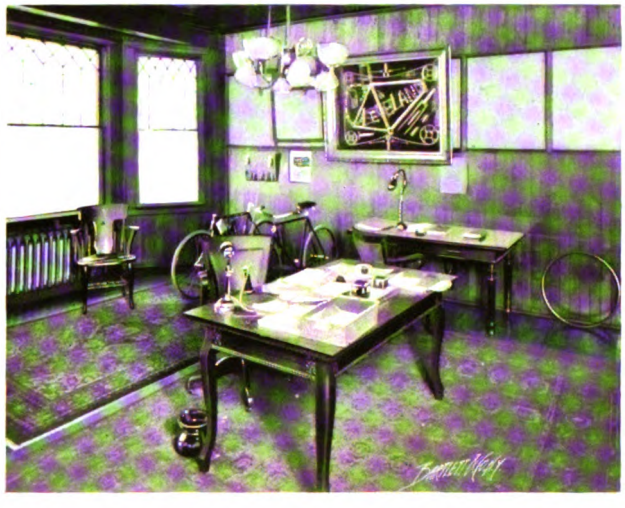
The Hagerstown factory is splendidly equipped with the most modern machinery for the economical and efficient production of fine, high-class work. A glance through the general machine shop reveals an apparently bewildering maze of intricate machinery, yet to the expert engineer it is apparent that all this machinery is arranged scientifically and correctly with a single eye to the rapid production of accurate work in large quantities.

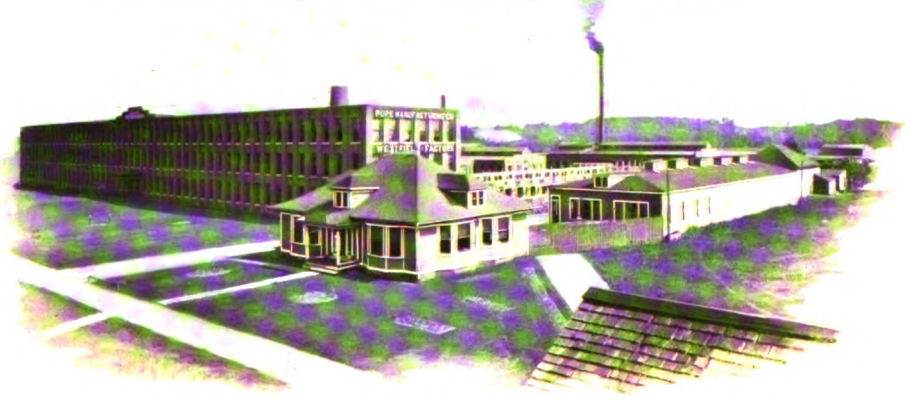
The manufacturing operations are practically divided into two separate departments, one of which is devoted largely to automobile production and the other department to the bicycle work—each particular line being under the supervision of experts especially trained for that purpose. In this way the requirements of each line of products are taken care of satisfactorily and without friction or interference.



Striping Frames

WESTFIELD FACTORY





Accounting Department
Manager's Office
View of the Factory

E. E. Hinsman . . . . . *Manager*

THE bicycle and the name of the Pope Manufacturing Company are intimately associated in the public mind. The company was the founder of the bicycle business in this country and has from the outset always been the largest maker and the dominating factor in the industry.

At Westfield, Massachusetts, a thriving New England manufacturing city, is located a plant of the Pope Manufacturing Company, devoted exclusively to the production of high-grade bicycles, saddles and other accessories. It has recently been enlarged to care for the increasing business.

This plant was designed and constructed especially for the purpose named and is provided with every modern labor-saving device. Special care and attention are given to the welfare and accommodation of the employees, with the resulting harmony and cooperation which are such notable features of all the Pope organizations.

The factory buildings are substantially designed and are comparatively new. The power plant is a successful example of the modern idea of economical power transmission by means of electric currents centrally generated. The current is conveyed from the power house to the different departments, which are run by individual electric motors, thus eliminating all main shaftings, pulleys and belts and effecting a marked saving in the cost of operation.

The factory is also provided with ample railroad facilities for handling its incoming and outgoing freight. On account of its location, its shipping facilities are good, and excellent connections can be made with the great railroad systems.

In this factory are built both chainless and chain-driven bicycles—such well-known and popular machines as the Columbia, Cleveland, Tribune and Rambler, all bicycles of international reputation and of the highest grade of workmanship. In addition to these, the Hartford, Westfield, Stormer, Crescent, Ideal, Monarch and Imperial bicycles are made; in fact, about everything which enters into the construction of a modern bicycle is produced in this plant except the rubber tires.

To the uninitiated, a bicycle is simply a bicycle, but a short visit to the Westfield factory of the Pope Manufacturing Company opens up a new line of thought, and the visitor is impressed with the fact that although the bicycle of to-day is a vehicle of great simplicity, yet this simplicity is wrought out only by the most careful thought and study, and the

WESTFIELD FACTORY

Nickel-plating Department
Wheel Assembling Department
Assembling Department

Enameling Department
Frame Department
Parts Stock Room

employment of the highest engineering and mechanical skill. This machinery has, to a large extent, been invented and built by men who are to-day in the employ of the Pope Manufacturing Company and is a result of needs which have arisen at various times. There is an old adage that "Necessity is the Mother of Invention." Nothing more strikingly illustrates the truth of this than the growth and development of the chainless bicycle.

It was early realized by the Pope Manufacturing Company that the chain-driven bicycle, although greatly in advance of anything before brought out, still had its limitations and it was seen that if a system of bevel gear driving could be devised by which the chain could be eliminated and all working parts enclosed in dust-proof, oil-tight casings, a marked increase of comfort and efficiency would be gained.

When the engineers of the Pope Manufacturing Company undertook the preliminary step towards its development, they found there was no machinery in existence which could accurately and economically cut bevel gears in sufficient quantities for their proper use, so they were obliged to begin at the very beginning and not only invent the chainless bicycle itself, but also the machinery with which to make it.

Improved models of these original machines are part of the product of the Westfield plant and the bevel gear department of this factory is practically the only one in existence to-day that can cut satisfactory bevel gears for bicycle use in commercial quantities.

The making of bevel gears is not only a process of great mechanical nicety, but is also of absorbing interest even to those to whom the mere mechanical details are not attractive.

It begins in the laboratory of the chemist where the proper formula for making the steel is determined, for this plays a very important part. The formula goes to the steel mill, where the ingredients called for are made up just as

Brazing Department

Gear Cutting Department

the skilled chemist compounds his prescriptions. When the billets come from the steel mills they are rolled and hammered to the proper size and the steel is then cut in small pieces, each approximating the weight of the required forging. These pieces of steel are then heated to the proper temperature and are forged into shape under powerful drop hammers. This forging is also an important part of the process as the metal is toughened and densified to a remarkable degree.

The blank gears are then accurately turned to their proper shape and the teeth are generated on the special machines referred to.

After this they are inspected and gauged, and so rigid is the test that the minutest imperfection causes them to be discarded as unworthy of forming a part of the Pope product.

Practically this same process is carried out in making all of the forged parts which enter into the bicycle except that each particular piece is made from its own analysis of steel—an analysis determined not only by the expert chemist, but also by twenty-nine years of manufacturing experience.

To no part of the bicycle has more careful thought and experiment been given than the designing and manufacture of the frames and forks. Every diameter, dimension and angle has been carefully worked out and the result is a paradoxical mechanical construction, upsetting many accepted engineering theories.

The body of the frame is built of fine steel tubing drawn without a seam or weld and fitting into joints formed of cold-rolled steel pressed in dies to their proper shape.

The frames are then heated in furnaces and the joints immersed in a solution of molten alloy which unites the frame parts in one continuous whole.

They are next placed in an electric bath and the surplus metal which adhered in the crucible is removed without injury to the steel. The frames are then highly polished and treated to successive coats of enamel baked on at high temperatures and producing the beautiful and durable finish characteristic of Pope bicycles.

The modern bicycle, like all mechanical masterpieces, is extremely simple in its final makeup, yet the uninitiated will be rather surprised to learn that, including the steel balls used in the bearings, there are between six and seven hundred individual pieces used in the manufacture of each machine. This will give, in a way, an idea of the complex nature of the manufacture of bicycles.

Taking into consideration the fact that the utmost accuracy is required, an accuracy equal to that effected in the manufacture of fine watches, one gains an increased respect for his bicycle and the work it is capable of doing.

Toledo Factory

Pope Motor Car Company

Officers and Directors

Albert A. Pope . . . *President* — Albert L. Pope . . *Vice-President*
George Pope . *Secretary and Treasurer* — Arthur W. Pope and Paul Walton

Toledo Department

A. E. Schaaf . . *Manager* — H. S. Leyman . *Assistant Manager*

THE factory of the Pope Motor Car Company, at Toledo, Ohio, is, next to the Hartford establishment, the largest and best equipped plant in the world devoted solely to the building of motor cars. From the very inception of the business the policy consistently followed by this company has been to produce all the essential parts of the machine within its own walls. This is the only automobile factory in the United States where chrome-nickel and alloy steels are worked into forgings and heat treated, annealed and tempered on the spot. The extreme difficulties involved in this process, which have forced other manufacturers to purchase their forgings, have been entirely overcome by the enterprise of the Pope concern. Until within a year, also, this company was the only manufacturer of four-cylinder gasoline automobiles to drop-forge its own crank shafts, and its success was the incentive to such of its competitors as have recently followed the example.

Purchasing Department

TOLEDO FACTORY

Assistant Manager's Office

Manager's Office

Sales Department

TOLEDO FACTORY

For ten years previous to 1900 the Toledo plant was devoted to a successful manufacturing industry. It was later acquired by the Pope Company and the designing and making of automobiles was begun. For this purpose the superb mechanical equipment and exceptionally skilled workmen at hand furnished the elements of the ideal factory now in operation. During the first year the Toledo steam car was built, a vehicle easily ranking first among the light steam roadsters of the day, both in superiority of material and in excellence of workmanship. With the waning popularity of steam cars the manufacture of gasoline vehicles was begun with two, three and four-cylinder models. The excellence of these machines was recognized at once, and by 1903 the Pope-Toledo had earned the reputation of representing the highest class of car work in America.

The history of the Pope-Toledo is typically American. Although one of the earliest machines in this country to embody the sound principles evolved by French designers, American inventive genius, adaptation and sound business judgment have improved on all precedents and created new elements of excellence. A very large product is completed annually, ranging from the famous "mile-a-minute" 50 horse-power touring car to the "landaulette" of 20-24 horse-power. Each is a monument of skill, designed and built with the utmost care, so as to produce a machine fit for either foreign or domestic use.

In all particulars the conduct of affairs maintains the highest standard of both materials and workmanship. The introduction of chrome-nickel steel was the strongest evidence of the intelligent determination to produce a car superior to all competitors. It was also a practical demonstration of the correctness of the Pope conviction that an automobile cannot be too well built.

Alloyed steel is expensive to buy, difficult to handle and hard to machine, requiring more and larger machines than any other alloys used in motor car work. The result, however, justifies the expense, since the material easily gives double the strength otherwise obtainable.

Sheet Metal Department

TOLEDO FACTORY

Draughting Department

Superintendent's Office

Stenographic Department

TOLEDO FACTORY

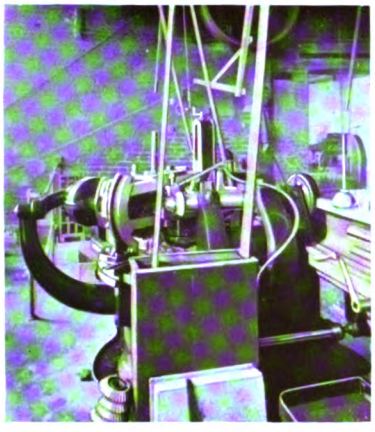
The greatest care is taken in the selection of material and in the physical tests which are made by the metallurgical department. By these provisions only the highest grade materials enter into the construction of the Pope-Toledo cars.

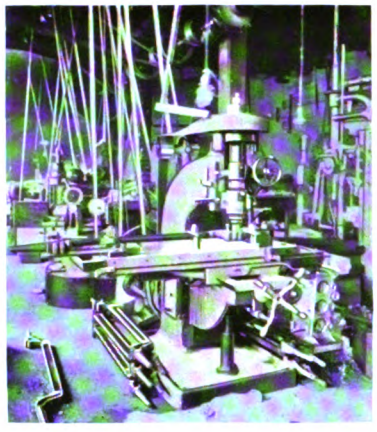
Alloyed steel is used in all working parts of this car, permitting either a very high tensile strength with a slight percentage of elongation, or a low tensile strength with a large percentage of elongation. In resistance to strain, shock and fatigue this material is unequaled. In spite of the difficulty of working it is ground with extreme accuracy. The crank shaft is so finely shaped that there is a variation of less than one-thousandth of an inch between its center and the two ends, and no shaft whose pins are out of round by as little as one-quarter of one-thousandth of an inch is permitted to be used. In fact, proper alignment of the moving parts and the careful balancing of all reciprocating parts are subjects receiving the greatest attention in the Toledo factory. Since in a properly synchronized motor all parts must be accurately made to size, only the most skilled workmen are employed and the greatest care is exercised not only that the weights of parts in rotation may be the same, but that the shapes and proportions may be alike. For this result the best hand labor is essential.

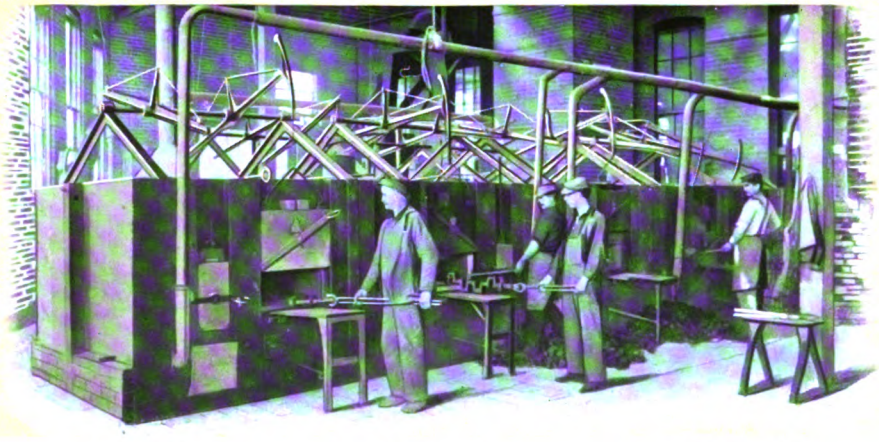
Chrome-nickel steel is used for the transmission — one of the most efficient, durable and noiseless on any American car — and in the axles. The metal of the axles is tested to an ultimate tensile strength of 140,000 pounds to the square inch, and may be bent to a right angle before breaking. Such axles will withstand not only powerful shocks, but the smaller disintegrating strains of vibration, which produce fatigue in metal. The Pope-Toledo factory was also a pioneer in the use of pressed steel for the frame work of a motor car. This material combines strength and lightness with superior rigidity. It does not crack nor check, and takes a very fine finish. The model body is first formed in wax and from it plaster casts are taken. From the plaster casts are made zinc dies, which are used for pressing the first steel body. After this sample body has been approved the cast-steel dies are cut and from these in turn any number of steel stampings may be made.

Rubbing Bodies

TOLEDO FACTORY







A Gear Cutter

Body Department
Furnaces for Annealing and Heat Treatment

A Milling Machine

TOLEDO FACTORY

The selection of material for cylinders involves several important problems. A metal suitable for this purpose must equal gray iron in its resistance to all distortion from internal heat and exceed it in strength and lightness. Its surface must be susceptible of taking a gloss like that of a fine gun barrel and yet resist the action of heat under operative conditions. Accordingly a special alloy iron is used, showing a tensile strength of 27,000 pounds per square inch.

Pistons are made from another special alloy iron, and are so shaped that they will not cut and score the cylinder, even when the engine is working under the heaviest loads.

The pistons and moving parts are ground on heavy machines, which are isolated and mounted upon cement foundations in order that no vibration may affect the accuracy of the resulting work.

Specially designed jigs are provided for turning the separate parts, and so extreme is the accuracy attained that a variation of one-thousandth of an inch is impossible, thus insuring perfect interchangeability, without hand filing or other adjustments. This accuracy carried out in all the hundreds of parts of the car involves a degree of careful skill and watchfulness that is no less than amazing.

The special alloy steel used for the valves can effectively resist extreme temperatures encountered in operation, and makes possible a retention of shape for long periods without regrinding. The determination of the proper alloy to achieve this end was the occasion of long and tedious experimentation, which furnished yet another evidence of the care expended upon the smallest parts of the mechanism, which some manufacturers might think they could afford to neglect.

The Pope-Toledo engine is of the high-compression type, and of extreme efficiency, developing one horse-power for every nine and six-tenths pounds of weight. The 1907 engine achieves the record for efficiency, developing one horse-power for each 52 pounds of car weight, even though provided with a body in which seven people may be seated with comfort. The shaft of the engine, like the other rotating parts of the car, runs on the efficient Deutsche Waffen Fabrik annular ball bearings. The double outside chain drive is employed on account of its superior efficiency in delivering high power from the engine to the rear wheels. The shaft drive although desirable in smaller vehicles has not proved so adaptable to heavy touring cars.

Finishing Chassis

TOLEDO FACTORY

Engine Assembling
Chassis Assembling
Transmission Assembling

Even the chains are made from chrome-nickel steel, another departure in America in which the Pope Companies take the lead.

The Pope-Toledo wheel is 36 inches in diameter, and has wide spokes of the finest quality second growth split hickory. The rear wheels have each spoke bossed and studded for the rear sprockets, and for securing the large diameter, wide-faced brake drums within. These are powerful internal expanding bands, thoroughly enclosed and protected from dust. Another brake is attached to the differential drum.

The body is of wood, except the tonneau and dash and front seats, which are of steel stampings, exceedingly light and strong. The acknowledged beauty of the Pope-Toledo lines represents many months of hard work on the part of the designers. They have imparted a degree of gracefulness to this car which has been nowhere else approached. The superb finish which has attracted admiring comment on both sides of the Atlantic is another evidence of untiring zeal for perfection. Six weeks are required for painting the body, during which it receives twenty-one distinct treatments, or more than are given the most expensive piano, which is only for indoor use. All body fillers, coloring pigments, rubbing and finishing varnishes are of the highest quality obtainable, and the workmanship is that of experts.

The finished engine is tested by being run on a belt for twenty hours, "to work in the bearings." It is then run forty hours on the jack, after which it is subjected to a horse-power test under its own power before being placed in the car. At this point the entire chassis is again tested by two inspectors. After passing them it goes to the finishing department and in time reaches the final assembling room, where the body is fitted. The car is then given a last run by a third inspector, after which it is ready for shipment.

At the time of shipping, the engine is again started just before it is placed in the freight car, to make sure that all the wiring, carburetor adjustments, etc., have not been deranged or disturbed.

It has not been forgotten by the world that "Pope" on the name-plate of a bicycle has always stood for the superior degree of quality, beauty and reliability. In the production of an automobile, therefore, there was a standard to maintain, because more is expected of a Pope product than of that of any other maker.

The standard has not only been maintained, but the great volume of Pope sales means that no other car has been so satisfactory to the buying public.

As an illustration of what the Pope-Toledo has accomplished it may be said the model for 1906, after having covered some 8000 miles, was put to a final and severe test by running it 782.7 miles in severe weather over rough hills and bad roads. Precisely 49 gallons and 3 quarts of gasoline were consumed, averaging 15.7 miles to the gallon. This is an achievement that has not been equaled by any other American or foreign car of corresponding weight.

TOLEDO FACTORY

Shipping Platform
Engine Testing Department
Loading Cars

Pope Motor Car Company

Waverley Department

Herbert H. Rice . . *Manager* Wilbur C. Johnson . *Assistant Manager*

THREE types of automobiles are familiar to the public to-day, distinguished by the driving power employed—gasoline, electric and steam. Five years ago the steam carriage was popular, particularly in the form of a light runabout. Many such machines, however, were defective in some details of construction and were troublesome, at least in the hands of unskilled drivers. The steamer finally gave place to the gasoline vehicle, which, numerically, is now the leading form of automobile. In the meantime, however, electric carriages have been constant rivals for popular favor for city or local service as well as for light passenger duty and heavy trucking. The work of improving and perfecting the electric has been attended with almost as little noise as its own operation, with the result that the world is now awakening to the fact that, thanks to improved batteries, perfected controllers and superior motor and machine design, the average travel radius has been almost doubled.

General Offices

INDIANAPOLIS FACTORY

Timekeeper's Office
Superintendent's Office

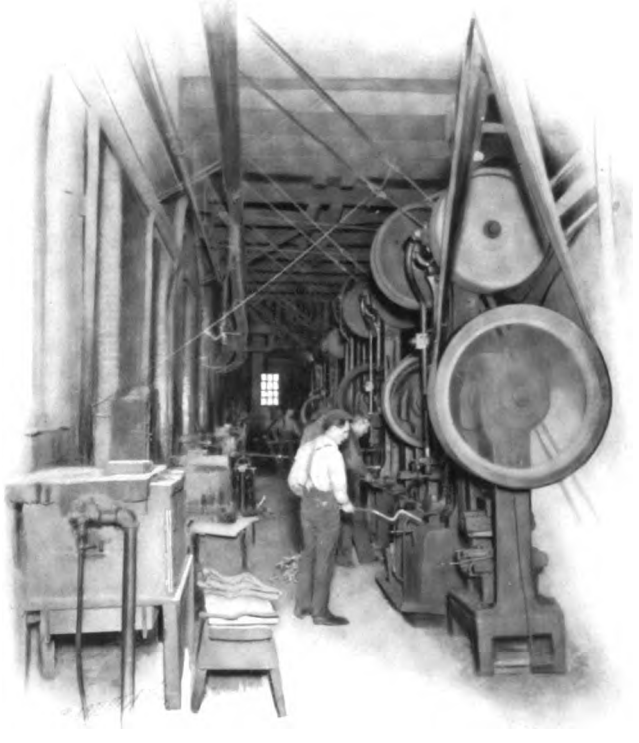
Manager's Office

Assistant Superintendent's Office
Assistant Manager's Office

INDIANAPOLIS FACTORY

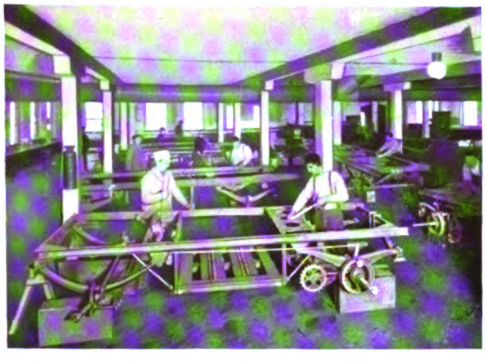
Another element which long militated against these cars was the former unwillingness of the electric lighting and power companies to supply current to garages at favorable terms. The result was that the electric carriage garage business was largely left to persons inexperienced in the handling of current, while the gasoline vehicle garage, far less expensive to start, became the more profitable. Conditions are now materially changed, however, and the electric automobile is steadily growing in favor with all classes of users. Its greater ease of handling and superior flexibility render it preferable for family service and for doctors' use, as well as for local trucking, in which the services of skilled drivers are unnecessary. It is also less expensive to maintain; it demands less "hostler's help," one battery man and two bright boys constituting a force sufficient to care for twenty vehicles in a garage. On the other hand, a conscientious, expert machinist is well occupied in caring for two gasoline cars. The electric is cleaner than one of any other power; requires less floor space for storage, may be operated in any kind of weather—cold, hot, or stormy—and has nothing to freeze, explode or catch fire. The insurance rates are lower for electrics. A gasoline vehicle may be insured for 80 per cent of its cost value at the rate of 2¼ per cent; for a steamer, insured for less than $1000, the rate is 2¾ per cent; for an electric the rate is only 2 per cent on the same basis, and is no higher than insurance covering other goods outside the "floater basis" upon which the above rates apply.

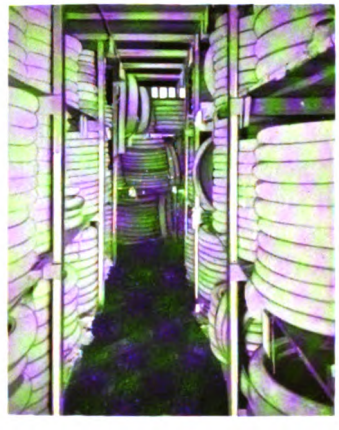
The Pope-Waverley electric vehicles lead the world in power and dependability. The policy consistently followed is to experiment constantly for better efficiency in both motor and battery, also to subject completed carriages to rigid tests in the hands of experienced drivers. The results achieved show that an average travel radius of between 35 and 45 miles per charge of battery is extremely conservative. One Waverley carriage equipped with its regular thirty-cell nine-plate battery and fast tires was run on sundry occasions during four days over 80⅛ miles without recharge. The way traveled led over city streets and suburban roads, over steep hills and through mud, carrying three passengers most of the time. Similarly, a Waverley carriage, privately owned in hilly Pittsburg, achieved a record of 67 miles by odometer; another in Cleveland showed 80 miles. These

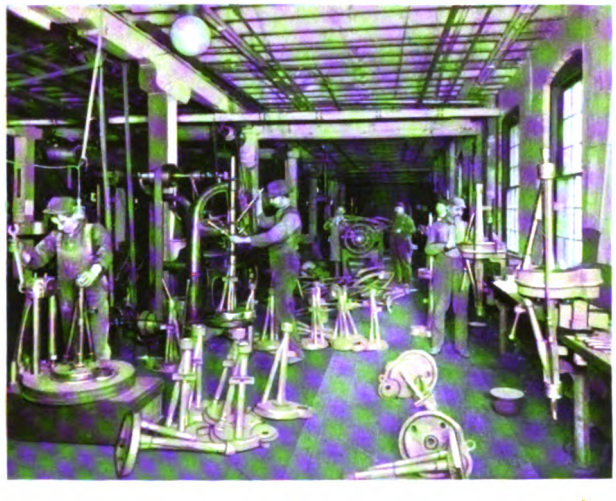


Drop Forge Department

INDIANAPOLIS FACTORY







Truck Assembling Department

Rear System Assembling
Body Department

Tire Storehouse

carriages were equipped with long distance tires regularly guaranteed by the makers, but the mileages were not obtained by resort to the use of high capacity batteries.

As the radius of distance has been gradually increased by improvements in batteries and motors and in uniformity of manufacturing, the function of the electric, within specified limits of mileage, has grown in the appreciation of the general public to the great advantage of this type of vehicle, so that to-day it is very popular as the family carriage, the doctor's rig, the contractor's runabout, etc. The greater skill in garaging — including the training of men to take proper care of batteries — has been one of the very important elements both in increasing the travel radius and in the general efficiency and life of electrics.

The plant of the Pope Motor Car Company, located in Indianapolis, Indiana, the center of population of the United States, is complete and up-to-date in all its equipment, and consistently follows the plan of manufacturing the essentials of its vehicles, as well as assembling them, adhering strictly to the rule of interchangeable parts, as in all the Pope plants. It is, with possibly one exception, the only electric vehicle concern in this country that manufactures its own motors, constructing all the metal parts and winding the armatures and field magnets.

The vehicle batteries are also made here, the plates only being purchased in "formed" condition.

The Indianapolis factory covers a total floor space in all departments of 200,000 square feet, and is the producer of more electric cars than any other plant in the world.

In passing through this plant, beginning with the office of the manager, and that of his assistant, and proceeding through all departments down to the storerooms and coal bunkers, the one thing that impresses the visitor more than all else is that it is a place consecrated to hard work, earnest effort and unfailing care. The splendid organizing and executive genius which is the life and soul of this enterprise also enlists the enthusiastic cooperation of all employees. The same high standard extends to the quality of the work; none but the most expert workmen are employed, and the best is expected of them.

As regards materials, their quality is assured by careful inspections and repeated tests. All cold-rolled steel comes from the company's own mill and the wood used is selected and

Wheel-making Department

INDIANAPOLIS FACTORY

Storehouse

Body Rubbing
Assembling Room

Battery Department

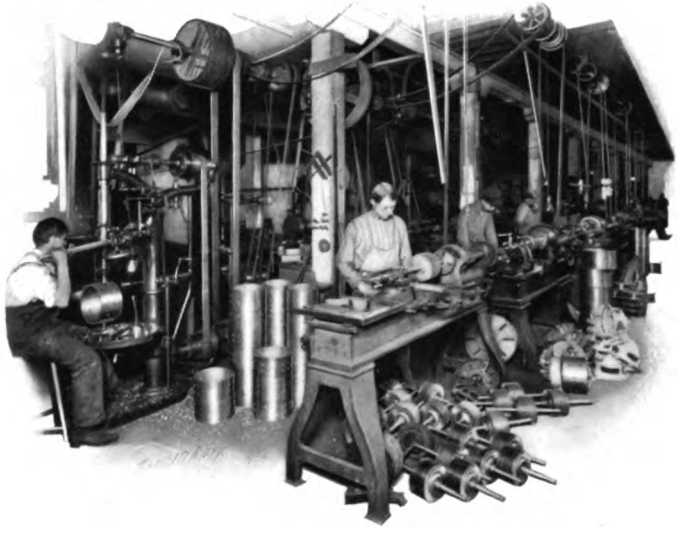
treated with the utmost care and intelligence. To insure dependable results the lumber stock is thoroughly seasoned and kiln dried. The woods principally used are poplar, for veneers and paneling; ash and maple and the finest grade of second-growth hickory for the wheels and top bows. The greater part of the wood working is done in the wood milling room, in which is an extensive equipment of wood-working machinery. This, with the adjacent assembly rooms, is sufficiently extensive to make it possible to build some bodies for the Hartford and Hagerstown factories, as well as all of those for the Pope-Waverley electrics.

Expert work is a feature in the body department, particularly in bending and shaping. Several sheets of fine poplar veneer are formed into a panel by laying them so that the grains of the alternate sheets run in opposite directions. Such a panel, in skilled hands, may be readily bent without danger of splitting or checking, and in this way are rendered possible the delicate curves for which the Pope vehicles are famous.

The wheel department is another wood-working branch whose product is more than sufficient for home consumption. The ancient art is practised with the most recent and up-to-date appliances, many of them designed in the factory for the express purpose of meeting the requirements of automobile construction. Hartford and Hagerstown are also supplied with these wheels. This department has its own drying and storage room.

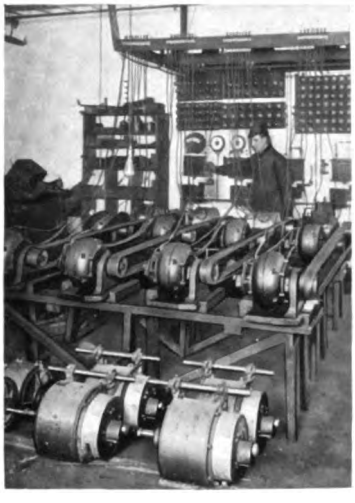
In the metal-working rooms one may learn many a new fact in regard to modern machine construction. The drop-forge department, with its battery of great hammers and its twenty-five oil furnaces of most recent type, has a producing capacity in excess of local requirements, and therefore does work for other departments of the company. The dies for drop forging are all produced on the spot. The blacksmith shop has a steam hammer, "bulldozer," and a complete line of the latest tempering and hardening furnaces. Here the art of hardening steel is practised in its highest and most advanced forms.

In the machine shops may be seen impressive rows of splendid apparatus for punching, drilling and turning light and heavy machine parts; also gears and sprocket cutters; ponderous



Motor Department

INDIANAPOLIS FACTORY



Testing Motors
Large Elevator

Making Fenders

Battery Room
Electric Wiring

bevel gear cutters and axle turners. Conspicuous in this array is a specially accurate Brown & Sharpe machine which cuts the herring-bone driving gear.

In other machine shops the motor cases are machined, bored and drilled. The field cores, four or six in number, according to the size and power of the motor, which are of soft iron laminations, are set in place, and the armature cores are mounted on their spindles and turned down. The fields and armatures are wound with the best of insulated wire, which is then thoroughly soaked with insulating varnish and baked. The finished and assembled motors are then placed upon the block and thoroughly tested before being set in the carriages.

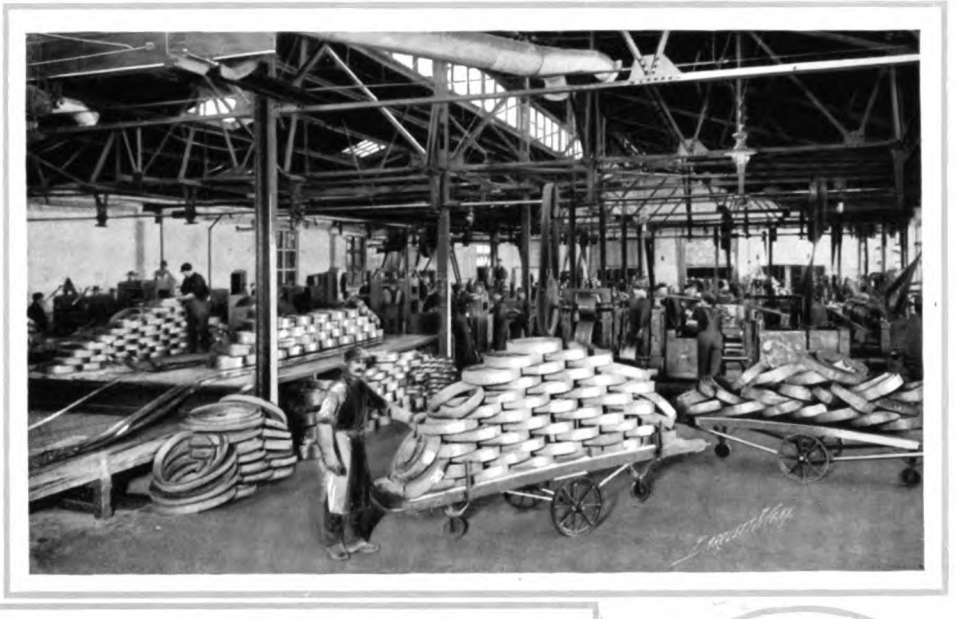
The battery departments introduce the investigator to new lines of activity. The plates, as received from the manufacturer, are assembled into groups of the proper number for each cell, and all the positives are burned together to a light, lead strip, and all the negatives in similar fashion, with wood and rubber separators between each pair of plates. These elements are now assembled in the cell, and the acid electrolyte is added. After charging, the cells are tested, and then the covers are placed on and the post connectors burned on and everything is ready for placing in the finished carriage.

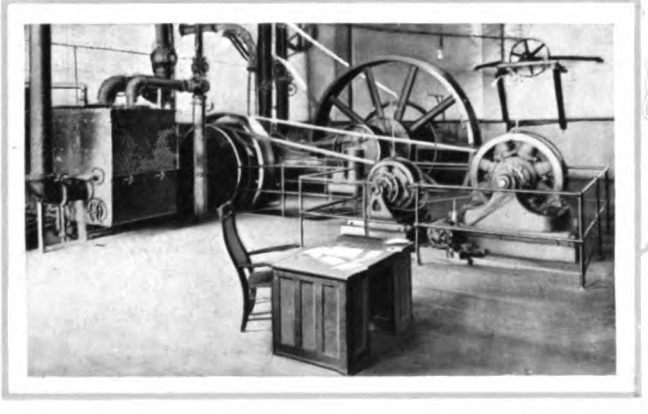
Such, in brief, are the various processes necessary for completing the machine parts of an electric carriage. The body and trimmings, however, are subjects of equally careful attention. The body, after assembling, is wired and equipped with its controller. It then receives the ground color and, after being placed upon the running gear, is subjected to repeated paintings, rubbings, varnishings and finishings, according to the most advanced principles of the carriage painting art. Nothing is too good for a Pope-Waverley ; no pains are spared in making it as nearly perfect as human skill can achieve. The giant Singer sewing machine was built for the purpose of stitching the leather of its mud-guards. The largest elevator ever installed in the west by the Otis Elevator Works serves to carry the finished car from the last department of the factory to the ground floor, whence it is wheeled to the extensive company shipping platforms alongside the railroad side tracks and there loaded upon the cars.

The ever-recurring rule is inspection and testing in all departments from the time the raw material is taken from the commodious, well-filled stock bins, until the carriage is finished and ready for the road. No one seems satisfied to " let well enough alone." The metal is tested ; the machined and finished parts are tested ; the motor is tested ; the battery cells are tested; every separate part and element is severely tested; and, finally, the assembled chassis is taken upon the road and thoroughly tried out before the finishing touches are added.

The Pope-Waverley electrics are noted for endurance, strength, hill-climbing, large radius of travel and high power capacity. The greatest ingenuity has been expended in perfecting their details and in securing the proper proportions of all the working parts. The result is the most serviceable vehicles for passenger or freight service. Over thirty models are produced, conspicuous among which are the one, three and five-ton heavy duty trucks ; and the light express delivery wagons ranging between five hundred and twelve hundred pounds. In addition to runabouts and vehicles for commercial use, a full line of passenger vehicles is produced, covering a wide range of styles and models, from the two-seat passenger runabout to the twelve-passenger bus. And they all " stand up "—all are equally efficient, reliable and permanently satisfactory.

ELYRIA ROLLING MILL





Engine Room

Machine Shop
Cold Rolling Department

Stock Room

Columbia Steel Company

Officers and Directors

Albert A. Pope . . . . *President* — Albert L. Pope . . . *Vice-President*
George Pope . *Secretary and Treasurer* — Charles E. Walker and W. C. Walker
C. E. Lozier . . . . *Manager*

THE Columbia Steel Company, one of the first producers of cold-rolled strip steel in America, and an important factor in the manufacture of both automobiles and bicycles, was founded in 1892. Its product is a soft open-hearth steel, which after being cold-rolled into strips and sheets can be pressed or drawn into any shape required, and for such purpose has practically superseded brass and copper except where the metal must be subjected to corrosive influences. In fact, within recent years the use of cold-rolled steel has grown by leaps and bounds and there appear to be no limits to its sphere of usefulness in the mechanical arts. At a comparatively trifling cost shapes or parts can be produced, which by ordinary processes would be prohibitively expensive. Stamped steel shapes have replaced many forms of light iron castings, the advantage being in favor of the more durable and less expensive product.

It is an interesting fact that the improvements in steel making rank among the most important of recent contributions to metallurgical science, and the industry which has given

Superintendent's Office

Manager's Office

the strongest impulse in this direction is the building of automobiles. It has occasioned exacting tests and exhaustive experiments and has already made possible results which would otherwise have been longer delayed.

The foundation of the automobile is in the frame, and no automobile can be better than its frame. This company makes more automobile frame steel than all other cold-rolling mills in the United States combined, and the position it occupies to-day has been earned by a consistent and persistent effort to produce steels guaranteed to meet the exacting requirements of automobile engineers. For years Columbia basic open-hearth steel has been "Standard" and is regularly specified for the frames of America's best cars. The company's chrome-nickel steel, "Maxmin," after being thoroughly tried out in racing cars, is coming into general use and will soon prove its importance as one of the factors that make for excellence in automobile building. Nothing in an automobile frame is more to be desired than maximum strength and minimum weight—now happily combined in the Columbia Steel Company's "Maxmin" steel.

The Columbia Steel Company, by persistent effort, has succeeded in locating furnaces producing a peculiar quality of steel required in the Pope products. Contracts have been made assuring an adequate supply of raw material for years to come. Manufacturers of steel stampings have learned that they can depend upon this company for material suitable to the most difficult operations. The effort to produce a finely finished and dependable steel has been crowned with success and the Columbia product has been recognized as standard.

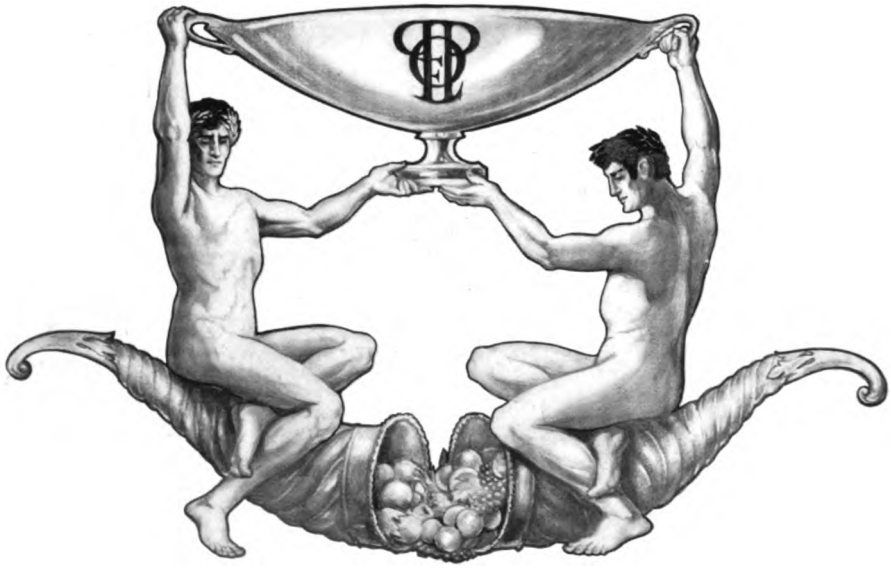
In stock are carried thousands of tons of material in a semi-finished state, which, with comparatively slight additional treatment, can be supplied on regular or emergency orders. This steel is rolled from selected billets of peculiar analysis, and to the company's own specifications. The steel is tested in the company's laboratory, and none is accepted unless it meets all physical and analytical requirements.

General Office

AWARDS

AWARDS

TROPHIES



TROPHIES

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